

*In Twelve Sections.*

THE

*Section vi-10/6 net*

# BRITISH BIRD BOOK

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200 PLATES IN COLOUR AND  
NUMEROUS PHOTOGRAPHS,

EDITED BY  
F. B. KIRKMAN · B. A. OXON

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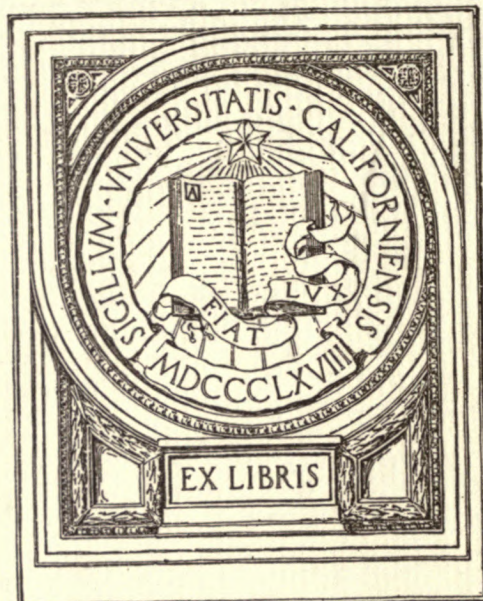
A COMPLETE WORK ON THE BIRDS, NESTS  
AND EGGS OF GREAT BRITAIN

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*London and Edinburgh ~ T. C. & E. C. JACK*

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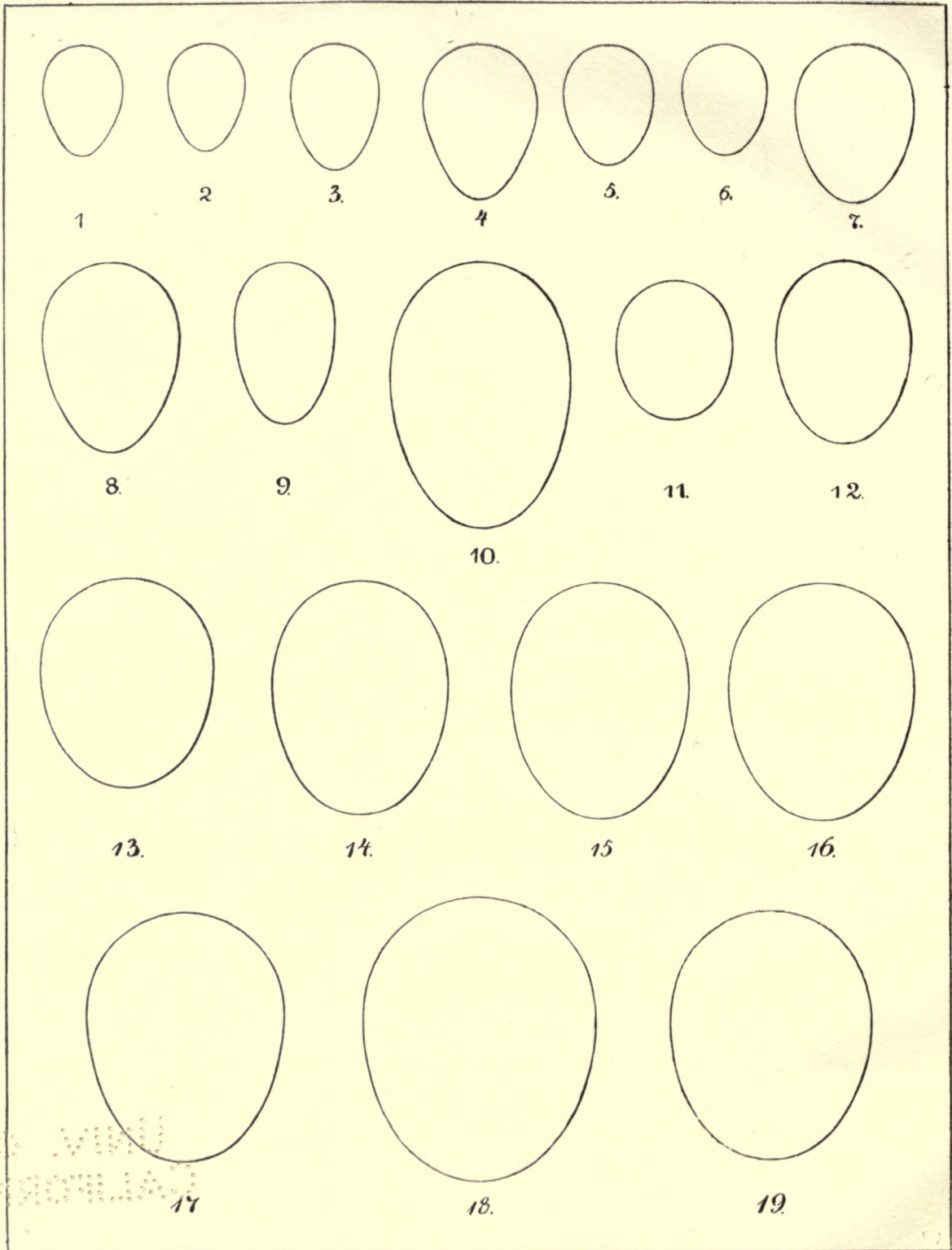












## Egg Plate E\*

(Shapes of Unspotted Eggs)

By H. Grönvold

- |                   |                             |                 |                    |
|-------------------|-----------------------------|-----------------|--------------------|
| 1. House-martin   | 6. Little-woodpecker        | 11. Kingfisher  | 16. Shorteared-owl |
| 2. Sand-martin    | 7. Great spotted-woodpecker | 12. Turtle-dove | 17. Barn-owl       |
| 3. Black-redstart | 8. Green-woodpecker         | 13. Little-owl  | 18. Brown-owl      |
| 4. Dipper         | 9. Swift                    | 14. Stock-dove  | 19. Longeared-owl  |
| 5. Wryneck        | 10. Ring-dove               | 15. Rock-dove   |                    |



# THE OWLS

[ORDER: *Coraciiformes*. FAMILY: *Strigidae*]

## PRELIMINARY CLASSIFIED NOTES

[F. C. R. JOURDAIN. W. P. PYCRAFT. A. L. THOMSON]

**BARN-OWL**<sup>1</sup> [*Strix flammæa* Linnæus; *Tyto alba alba* (Scopoli).<sup>2</sup> White-owl, screech-owl, jenny-howlet, church-owl, ullet or hullot. French, *effraye*; German, *Schleiereule*; Italian, *barbagianni*].

**1. Description.**—The barn-owl is distinguishable at once from all other British owls by the orange-buff of the upper parts and the white under parts. The sexes are alike. (Pl. 80.) Length 13·5 in. [342·90 mm.]. The disc feathers are white enlivened by a patch of rust-red around the eye, which is of a dark brown, almost black colour; the peripheral disc feathers are tipped with buff. The orange-buff of the upper parts is variegated by dull white spots and dusky vermiculations, giving a hoary appearance, especially on the back and wing-coverts. The secondaries are of a paler buff transversely barred with grey, the innermost with grey vermiculations like the back. The primaries have faint grey bars across the inner, and strongly marked oblique bars across the outer webs. The outer tail feathers have buff outer and white inner webs, transversely barred with narrow bands of dark grey; the tips are white vermiculated with grey. The under parts are white, tinged more or less markedly with buff on the breast, and spotted with grey on the flanks. The lower part of the foot and toes is sparsely covered with bristles, and the inner edge of the middle claw is serrated. Eyes dark brown, nearly black. The nestling develops two generations of nestling down, both of which are of the degenerate, umbelliform type, and white in colour. The juvenile plumage is indistinguishable from that of the adult. [W. P. P.]

<sup>1</sup> Subspecifically: the whitebreasted barn-owl. See list on p. 393.

<sup>2</sup> See footnotes to the shorteared-owl and barn-owl.



**2. Distribution.**—The barn or white-owl is a cosmopolitan species, for some form or other of this widely distributed bird may be found resident locally throughout the greater part of Europe, Asia, Africa, America, and Australia, in districts suited to its habits. The white-breasted form, which is resident with us, is in Dr. Hartert's opinion also met with in the west of the European continent, in Western France, the Iberian Peninsula, Morocco, and Algeria, as well as in the Mediterranean basin south of the Alpine system. Other authorities, such as Kleinschmidt, separate the British, Spanish, Sardinian, and Italian forms subspecifically. In Great Britain it is tolerably general in England, except where shot or trapped down by ignorant keepers and others, and often manages to survive in thickly populated manufacturing districts, where there is no game preservation. In Wales it is scarce, and in Northern Scotland it is very local and scarce, but is known to breed as far north as Caithness, and also in Skye and some of the Inner Hebrides. In Ireland it is also resident, but not numerous. [F. C. R. J.]

**3. Migration.**—Resident, and probably stationary. There is little evidence of any migration, but there may possibly be a partial southward movement within our area in autumn, seeing that the bird has been thought by some to become more numerous in parts of the south of England during the winter months (cf. Boyd Alexander, cited by Ticehurst, *B. of Kent*, 1909, p. 249). The autumn immigrants from overseas belong to the Central European form. [A. L. T.]

**4. Nest and Eggs.**—Strictly speaking, no nest is made by this bird, which breeds in some dark recess in a building, such as a church tower, old barn or farm building, and occasionally in a dovecot. It also resorts at times to deep holes in trees, and crevices in rocks or caves. (Pl. XXXIV.) Exceptional cases have been recorded of breeding in corn-ricks, and old nests of jackdaw and stock-dove (*Zoologist*, 1905, pp. 34 and 71). As the same hole is often occupied for many years consecutively, great quantities of pellets are often found within it. The number of eggs varies as a rule from 4 to 6, less commonly 7 or 8, and 10-11 have been occasionally recorded. In many cases they are laid in pairs at considerable intervals, so that fresh eggs, incubated eggs, and young may be found in the same hole. This is by no means invariably the case, for I have taken 6 eggs, none of which showed more than the slightest traces of incubation, and also found 6 young, in the nest of approximately the same stage of development, and the Rev. M. A. Mathew records a clutch of 10 eggs, all fresh. In shape they are somewhat elongated, pure white in colour, without the gloss so apparent on pigeons' eggs. (Pl. E\*.) Average size of 47 British eggs,  $1.59 \times 1.25$  in. [ $40.4 \times 31.7$  mm.]. As a rule the eggs are not laid





Photo by F. E. Daniel

Young barn owl at the entrance to its nest-hole



Photo by F. E. Daniel

Short-eared owl's nest and eggs



Photo by F. E. Daniel

Young short-eared owls in nest



Photo by Riley Fortune

Tawny owl nest and eggs among the roots of a tree on a bank







till the latter part of April or in May, but the breeding season is somewhat irregular, and eggs have been found at the end of March (*Zoologist*, 1867, p. 601). Incubation, which lasts about four weeks, though incorrectly given by older writers at about three weeks, is, according to Mr. J. L. Bonhote, who has bred and carefully watched the species in captivity, performed by the hen alone. In England a second brood is frequently reared, and the eggs may be found in July, while instances of breeding in late autumn and even midwinter have been recorded. [F. C. R. J.]

5. **Food.**—The staple diet of the white-owl consists of field-voles (short-tailed field-mice), longtailed field-mice, common shrews, and brown rats. The bank-vole is also not infrequently taken in districts where it is common, while remains of lesser-shrew, water-shrew, house-mouse, water-vole, and mole are occasionally detected, and there are one or two records of the discovery of skulls of squirrel, bats, and rabbit among large series of pellets. Sparrows are frequently captured; thrushes, blackbirds, and small birds occasionally; while remains of frogs and beetles have also been recorded. For analyses of series of pellets see Dr. Altum, *Journal für Ornithologie*, 1863, pp. 44, 218; L. E. Adams, *Journal of the Northamptonshire Nat. Hist. Soc.*, June 1898, p. 49; F. C. R. Jourdain, *Essay on the Economic Value of Birds* (Soc. Prot. Birds, Leaflet No. 47); and Freiherr G. v. Schweppenburg, *Jour. f. Orn.*, 1906, p. 534. Eleven hundred and twenty-four pellets analysed by Mr. Adams yielded the following results:—997 field-voles, 726 mice, 469 shrews, 205 rats, 97 sparrows, 81 other birds, 10 water-voles, 9 frogs, 5 moles, 3 beetles, 2 rabbits, and 1 squirrel. Freiherr Geyr von Schweppenburg estimates the proportion of shrews on the Continent at 30 per cent., mice 22 per cent., and voles 44 per cent. [F. C. R. J.]

6. **Song Period.**—The barn-owl has no "song," but is most vociferous during the early part of the year. [W. P. P.]

**TAWNY-OWL** [*Syrnium alúco* (Linnæus); *Strix alúco*, Linnæus.<sup>1</sup> Wood-owl, brown-owl, howlet, hooter, brown-ullert. French, *hulotte*, *chat-huant*; German, *Waldkauz*; Italian, *gufo selvatico*].

1. **Description.**—The tawny-owl may be distinguished from all the other British owls by the densely feathered legs and toes, also by the shape of the

<sup>1</sup> The right name by strict rule of priority. We are here forced to disregard it in order to avoid any suggestion of generic relationship with *Strix flammea*. See footnote to the short-eared-owl. A good illustration of the advantages of a uniform international terminology.—  
EDIT.



aperture of the external ear; and from all, except the barn-owl, by the large, dark brown, almost black eyes. (Pl. 82.) Length 15 in. [381 mm.]. The coloration of this bird is very variable, presenting distinct grey and red phases, as well as intermediate hues. In the typical grey phase the ground-colour of the plumage is ash-grey, the disc is also grey and vermiculated with darker grey, with a peripheral band of dark brown. The plumage above is striated with dark brown, and mottled with paler brown and white. The outer scapular feathers have each a large patch of white on the outer web, the combined patches of several feathers forming a more or less complete longitudinal white bar; the rest of the scapulars have dark brown shaft-streaks, and coarse vermiculations of dark brown. The lesser wing-coverts are indistinctly mottled and barred with dark brown, the median, with large patches of white at their tips, forming a more or less distinct white bar. The major coverts are greyish brown, heavily barred with sepia, and with a large white spot at the tip of the outer web. The major coverts of the primaries have no white patch, and are darker brown. The primaries are pale brown, transversely barred with pale sepia, the outermost feathers with the outer webs barred alternately with brown and white. The secondaries are pale brown, barred across both webs with pale sepia, the bars on the outer and inner webs alternating; the interspaces between the bands of sepia on the outer webs are white with irregular vermiculations of sepia, and tinged with brown. The tail is greyish brown heavily barred with pale sepia, and tipped with white, but in the middle feathers the barring is indistinct, giving place to vermiculations. The under parts are broadly striated and indistinctly barred with dark brown, and faintly mottled with pale brown. In the red phase the ground-colour of the upper surface is of a red-brown hue, with dusky striations and bars arranged much as in the grey phase, but more sharply defined, while the breast and flanks are of a dull white with dusky striations and faint rust-coloured bars. The abdomen is white. The first down (protopyle) plumage is of buff-coloured, umbelliform tufts, the second (mesoptyle) of buff-coloured, semi-plumous feathers marked with dusky transverse bars. The first teleoptyle plumage is like that of the adults. [W. P. P.]

**2. Distribution.**—Resident in Great Britain and throughout the greater part of the European continent, but in the southern part of its range known chiefly as a mountain-haunting species. A paler form inhabits North-west Africa, and to the east this species ranges into Asia Minor and Turkestan, but is absent from Siberia. Northward its range extends to Trondhjems Fjord in Norway and lat. 64°-65° N. in Sweden, beyond which limits it is rare, while in Russia it is found up



to about lat. 61° N. and the Ural range on the east side. In the British Isles it is fairly common in most wooded districts of England and Wales, while in Scotland it is general in the south and in the Great Glen, while it has increased its range northward and is now found in Sutherland and Caithness, as well as on Skye and the wooded islands of the Inner Hebrides, but no definite proof of its occurrence in Ireland is as yet forthcoming. [F. C. R. J.]

**3. Migration.**—Resident and stationary. Single records from the Færoes and from Heligoland are evidence of exceptional migration, but, as a rule, the species is conspicuously non-migratory. In this connection it has been described as follows: "One of the most sedentary of our native birds, this owl rarely wanders, and I can find no evidence whatever of any migratory movement taking place either locally or generally" (Ticehurst, *B. of Kent*, 1909, p. 254). [A. L. T.]

**4. Nest and Eggs.**—Generally the brown-owl prefers to breed in a hole, usually in a tree, but occasionally on ledges of rocks, and, more rarely, inside buildings, such as old barns or ruins, or in crevices of cliffs. When hollow trees are not available, the brown-owl will take possession of an old nest of buzzard, sparrowhawk, magpie, rook, crow, or squirrel, and will sometimes breed thus in the middle of a rookery. Several instances are also on record of nesting on the ground (as in the case of the longeared-owl) at the foot of trees, or in rabbit burrows, or under shelter of branches (cf. *British Birds*, iv. pp. 24-25). (Pl. xxxiv.) No nesting material is used, and the eggs, which are large, pure white, and more glossy than most owls' eggs, are generally from 2-4 in number, though clutches of 5 and even 6 have occasionally been met with, and are laid at intervals of two days or so. (Pl. E\*.) Average size of 100 eggs, 1.84 × 1.52 in. [46.9 × 38.7 mm.]. The breeding season generally begins about the middle of March, but occasionally clutches may be found at the end of February or during April. Reliable data as to the period of incubation seem to be wanting: Naumann merely states that the hen incubates for over three weeks, but it is improbable that the period lasts for less than four weeks. Occasionally the male bird is very savage, and resents an approach to the nest in no undecided way, striking hard from behind at the head of the intruder. Only a single brood is normally reared in the season, but an instance of a nest with eggs in September in Dumfriesshire is recorded by Mr. R. Service in the *Zoologist*, 1892, p. 424. [F. C. R. J.]

**5. Food.**—The diet of this species is much like that of the white-owl, but it is a more powerful bird and more inclined to attack larger game. Field-voles and



common shrews furnish the bulk of its food, but the longtailed field-mouse is also commonly taken as well as the brown rat. Other mammals recorded in smaller numbers are the bank-vole, rabbit, house-mouse, water-shrew, squirrel, and lesser-shrew, as well as an occasional bat or young hare; while among the birds, the sparrow is the most frequent victim, but it is said to have taken pigeons on more than one occasion. Beetles, lizards, fish, and frogs also figure on its dietary. I have found eleven dead starlings in one nest, and have seen six rats, neatly arranged in a row with their tails all pointing the same way, in another. For further notes on the food of this bird see the papers referred to in the "Classified Notes" on the whitebreasted barn-owl (§ 5). [F. C. R. J.]

6. **Song Period.**—Most vociferous during the breeding season.

**LONGEARED-OWL** [*Asio otus* (Linnæus). Horned-owl. French, *moyen duc*; German, *Waldohreule*; Italian, *gufo comune*].

1. **Description.**—The longeared is distinguished from the shorteared-owl at a glance by the long "ear" tufts, the transverse barring and vermiculation of the under parts, and the vermiculations of dark brown on a dull buff ground of the upper surface. The female differs from the male in being slightly larger and darker. (Pl. 81.) Length 14 in. [355-60 mm.]. Eyes golden yellow. The facial disc has the outer portion buff coloured, the inner white, with a patch of black above the eye, while the periphery is outlined in black and white. The "horns" or "ear" tufts, an inch and a half in length, and composed of seven or eight feathers, are dusky, with an outer margin of white and an inner margin of buff. The upper parts are of a pale buff, with broad dusky striations and faint mottlings of white. The scapulars and wing-coverts are buff tipped with white, relieved by dusky shaft-streaks and vermiculations; but the hindmost and outermost scapulars and median coverts have large white spots at the tips of the outer webs, forming more or less conspicuous white areas. The secondaries have the outer webs brownish grey, with dusky transverse bars and vermiculations, the inner webs buff, and similarly barred. The primaries are of a rich buff, shading towards the tip into brownish grey, and heavily barred with dark brown. The first primary has the outer web serrated, while the margins of the second and third are emarginate, with serrations along the emarginated region. The tail feathers are buff, shading towards the tip into brownish grey and marked by dusky bars; on the two middle feathers the bars are broader, and flecked with buff. The breast and flanks are buff, the fore-breast relieved by dusky



striations, while the lower breast and flank feathers shade towards the tip into white, and have transverse vermiculated dusky bars and dusky shaft-streaks. The legs and toes are feathered and buff coloured. The first generation of nestling down feathers (protopyles) are umbelliform and buff coloured, the second generation (mesoptyle) are semi-plumous, and crossed by dusky bars. The first teleoptyle plumage is like that of the adults. [W. P. P.]

**2. Distribution.**—This is a widely distributed species, which inhabits the greater part of Europe, Northern Africa, Northern Asia, and North America. The race which inhabits the British Isles, *Asio otus otus* (L.), is found on the continent of Europe to about lat. 63° N., as well as in North-western Africa and Northern Asia, while allied forms are found in the Atlantic Isles, Abyssinia, and North America. It is not rare as a resident in the woodlands of Great Britain and Ireland, and has bred in the Orkneys and in the wooded islands of the Inner Hebrides, while it has also occurred on the Outer Hebrides, and is said to have bred on N. Uist, and on migration in the Shetlands, but does not breed there. [F. C. R. J.]

**3. Migration.**—A resident and a winter visitor. There is little or no evidence of migratory movement on the part of the British-breeding individuals, but a considerable number of birds from Northern Europe pass the winter in Great Britain. The species occurs in Shetland on migration, and “as an immigrant it is observed annually on the coast in the vicinity of Spurn, and at the Teesmouth, but in very limited numbers, and arrives there . . . usually in the latter days of November or in December” (Nelson, *B. of Yorks.*, 1907, p. 296). In the south of England an increase in the numbers of this species becomes apparent in October; the newcomers “probably do not come direct from the Continent, but whether they are British bred birds that have moved south, or whether they are continental birds that have arrived on the east coast farther north than Kent, it is impossible at present to say; neither have we any evidence of a passage through the county either to the west or the south” (Ticehurst, *B. of Kent*, 1909, p. 250). The migratory movements do not extend to Ireland, for although the species has been obtained exceptionally on Rathlin Island, and at the Tuskar, “there is little evidence of seasonal migration” (cf. Ussher and Warren, *B. of Ireland*, 1900, p. 115). In winter the species is to some extent gregarious (cf. Nelson, *loc. cit.*; and others). [A. L. T.]

**4. Nest and Eggs.**—The usual breeding-place of this owl in the British Isles is in the flattened nest of a crow, rook, magpie, jackdaw, sparrow-hawk, heron,



or wood-pigeon. Most of these nests are old and deserted by their former owners, but I have known a pair of longeared-owls to eject magpies from a newly built nest. Squirrels' dreys are also frequently utilised, and occasionally a nest may be found on the ground, not only in treeless situations, but also occasionally in plantations (cf. *Ann. Scot. Nat. Hist.*, 1898, p. 50 ; 1902, p. 200 : *Field*, Nov. 22, 1902 : *Zoologist*, 1901, p. 31 ; 1904, p. 250 ; 1900, p. 193, etc.). By preference a nest in a thick belt of spruce or other evergreen conifer is generally selected.<sup>1</sup> (Pl. 81.) The usual number of eggs is from 3-5 or rarely 6, but on the Continent clutches of 7 and even 8 eggs have been recorded. They are white, closely resembling those of the white-owl, but are rather more rounded in shape and have a more decided gloss, though, of course, much less than the eggs of pigeons. Average size of 100 eggs, 1.58 × 1.26 in. [40.3 × 32.2 mm.]. The breeding season is generally during the latter half of March or early in April, exceptionally as early as the end of February. With regard to the period of incubation there is considerable difference of opinion, but probably about four weeks is the correct time. An egg hatched out in an incubator on the 27th day (W. Evans), and Mr. S. E. Brock gives the period as 28-30 days (cf. W. Schuster, *Zeitschr. für Oologie*, xiii. p. 53). Incubation is certainly chiefly, and probably entirely, performed by the hen, who is supplied with food by her mate. There is some evidence that occasionally a second brood is reared. [F. C. R. J.]

**5. Food.**—This is a woodland haunting species, whose food consists chiefly of longtailed field-mice, but it also kills many brown rats. Other mammals whose remains have been discovered in pellets are the common and lesser shrews, house-mouse, field-vole, water-vole, dormouse, and bats. Sparrows and other small birds are not infrequently taken, and remains of toads as well as frogs have been found in castings, besides numerous large beetles, especially *Geotrupes stercorarius* and *Melolontha vulgaris*. In Germany voles appear to furnish 81 per cent. of the food of this species (*Jour. f. Orn.*, 1906, p. 544). [F. C. R. J.]

**6. Song Period.**—Most vociferous during the breeding season. [W. P. P.]

<sup>1</sup> On the Continent the eggs are said to have been found occasionally in holes of trees, but there seems to be no clear evidence of this habit in the British Isles (cf. Naumann, *Naturgeschichte d. Vögel Mitteleuropas*, v. p. 57). On the Continent it also makes use of the nests of the larger birds of prey—buzzards, goshawks, kites, etc.



**SHORTEARED-OWL** [*Asio accipitrinus* (Pallas); *Asio flammeus*, Pontoppidan.<sup>1</sup> Woodcock-owl, moor-owl, fern-owl; catyogle, grey or brown yogle (Shetlands). French, *duc à courtes oreilles*; German, *Sumpfohreule*; Italian, *gufo di padule*].

1. **Description.**—The shorteared differs conspicuously from the longeared-owl in the absence of vermiculations on the upper parts, and transverse barrings below, also in the shortness of the “ears.” The female is larger and darker than the male. The eyes are golden yellow. (Pl. 84.) Length, 14·5 in. [368·30 mm.]. The disc feathers are greyish buff, black round the eyes, and the forepart, on either side of the beak, white. The plumage above is buff, broadly striated with sepia on the head, hind-neck, and interscapulars. The innermost scapulars are marked with broad arrow-shaped shaft-streaks of sepia, the outermost with broad shaft-streaks of sepia spreading out into irregular transverse bars. The feathers along the outer edge of the anterior end of the tract have the outer webs mostly buff, and crossed by transverse bars of sepia, forming a row of large oval buff spots. The wing-coverts and remiges are more or less regularly chequered with bars of buff and sepia, very broad on the remiges. The tail is buff, crossed by four or five broad bars of sepia. On the two middle feathers the bars expand at the fore-edge of the feather so as to meet one another and enclose a row of oval buff spots. The under parts are of a pale buff colour striated with sepia, generally broadly on the fore-breast, narrowly on the flanks. The first down (protopyle) plumage is of a dirty white colour. Nothing seems to have been recorded as to the mesoptyle plumage. [W. P. P.]

2. **Distribution.**—This species is more migratory in its habits than most of the owls, and is better known in many parts of the British Isles as an autumn and winter visitor than as a breeding species. Outside the British Isles it has a very extensive range, inhabiting the greater part of the European and North Asiatic continents, North Africa, and ranging throughout North and South America, and being resident in some of the island groups of the Pacific. It is, however, difficult to distinguish between the breeding and winter ranges of this bird, for often its presence or absence is determined by the food-supply, and it is usually present in numbers during periods of abnormal increase of small rodents. In Northern Europe

<sup>1</sup> This should be, by strict rule of priority, the right name of this species, if we accept the view, sanctioned in America, that the figure to which the specific term *flammeus* is attached in Pontoppidan's work does represent a shorteared-owl, in which case *Tyto alba* becomes the name of the barn-owl. We hesitate, however, to adopt so revolutionary a change while the actual fact of priority itself seems open to doubt.—EDIT.



it is a migrant, breeding locally in suitable ground to within the Arctic Circle and south to the Mediterranean, but absent as a breeding species from the Iberian Peninsula and Greece. In Great Britain it is also somewhat sparingly and locally distributed in moorlands and marshes as a breeding species, but chiefly on the northern moors, although a few pairs breed south of the Pennines, *e.g.* in the Devonian Peninsula, East Anglia, Lincolnshire, Wales, etc. It also nests in the Inner and Outer Hebrides, Orkneys and Shetlands, and has bred in the Isle of Man, but not in Ireland apparently, although the country seems well suited to its habits. [F. C. R. J.]

**3. Migration.**—A resident in variable but generally small numbers, a winter visitor in large but also variable numbers, and probably also a bird of passage to a slight extent. The distribution of the British-breeding stock is both local and variable, but in winter the species is common and generally distributed throughout the British Isles, including Ireland, where it is not known to remain to nest. The immigration takes place from Northern Europe on the eastern seaboard of Great Britain, including the northern isles. It becomes noticeable in the last days of September, and persists till the middle of November or later. The spring emigration is less noticeable, but takes place in March and April. October to January is the period in which it is abundant in Ireland (cf. Ussher and Warren, *B. of Ireland*, 1900, pp. 116-17). There is some evidence of an autumnal passage through Kent and across the Straits of Dover, with a corresponding return journey in spring (cf. Ticehurst, *B. of Kent*, 1909, pp. 251-52). As regards habits, it may be said that this owl migrates both by night and by day; on the Yorkshire coast, for instance, it is noted as arriving "at all hours of the day, from early morn till late afternoon" (cf. Nelson, *B. of Yorks.*, 1907, p. 299). It is commonly seen about the lanterns of lighthouses at night, not striking against it like other birds, but preying on the thrushes and other migrants attracted by the glare (cf. Gätke, *Vogelwarte Helgoland*, Eng. trans., 1895, pp. 195-96; Nelson, *op. cit.*, p. 298; and Rintoul and Baxter, *Ann. Scot. Nat. Hist.*, 1909, p. 16). As a migrant, the shorteared-owl is gregarious to a very considerable extent: on the Yorkshire coast it often arrives in parties of from ten to twenty (cf. Nelson, *loc. cit.*); on Heligoland, in flocks of twenty or more (cf. Gätke, *loc. cit.*); and in the autumn of 1907, on Fair Isle (Shetlands), "on two occasions from forty to fifty were observed" (cf. Clarke, *Ann. Scot. Nat. Hist.*, 1908, p. 83). The variability of the numbers of this species from year to year, both as a resident and as a winter visitor, and the interesting connection of this with the numbers of the common field-vole (*Microtus agrestis*), is discussed



elsewhere (cf. p. 406 *postea*; and also Ticehurst, *op. cit.*, pp. 252-53; Cordeaux, *Zoologist*, 1877, p. 9 *et seq.*; Ussher and Warren, *loc. cit.*; Williams, *British Birds*, i. p. 358; and others). [A. L. T.]

**4. Nest and Eggs.**—Though the nesting-sites vary considerably, they are all on the ground: sometimes among rushes and coarse vegetation in a marsh or among cut reeds; on the moorlands often among thick heather; while on the hill pastures the eggs are merely laid in a depression or scratching in short grass, and among sand-dunes in a hollow among the sand and marram grass. (Pl. XXXIV.) Here the eggs are laid, usually from 4-7 or 8 in number, but during vole plagues many nests have been found with 10 eggs, and even 12-13, and in one instance 14! Considerable intervals take place, as a rule, in such cases between the first and last laid eggs. They are white, in texture and lack of gloss resembling other owls' eggs, and rather variable in size and shape. (Pl. E\*.) Average of 100 eggs,  $1.57 \times 1.21$  in. [ $39.9 \times 30.9$  mm.]. The normal breeding season begins during the latter part of April, but during vole plagues clutches have been found as early as February, and in such seasons probably two or three broods are reared. Incubation is carried on by the hen, who sits very closely, while her mate keeps guard not far away. Probably the duration is about the same as that of the other smaller owls, viz. about four weeks. [F. C. R. J.]

**5. Food.**—During the vole plagues it is chiefly this species which has been instrumental in reducing the abnormally large numbers of field-voles. As a rule pellets of this species are not easily obtainable for examination, so that our information is comparatively defective. Geyr von Schweppenburg's researches in Germany, however, give the following results:—voles, 87.20 per cent.; mice, 11.20 per cent.; birds, .90 per cent.; bank-vole, .70 per cent. It is said occasionally to take rabbits (Gätke), moles, frogs, and the larger insects, and Howard Saunders states that it also feeds on lemmings, bats, and fish. [F. C. R. J.]

**6. Song Period.**—Is most vociferous during the breeding season. [W. P. P.]

**LITTLE-OWL** [*Athéne noctua* (Scopoli). French, *chevêche*; German, *Steinkauz*; Italian, *civetta*].

**1. Description.**—The little-owl is to be distinguished by its greyish brown coloration, spotted and barred with white, and the swollen, pea-shaped prominence in which the nostril is placed. The female differs from the male in its larger size. (Pl. 84.) Length, male, 9 in. [ $228.60$  mm.], female, 9.5 in. [ $241.30$  mm.]. Irides



yellow. The disc feathers are not sharply defined, and of a dull white, tinged with brown on either side. The close brown of the upper parts is relieved by spots of dull white, forming more or less well-marked striations on the scapulars, and bars on the wing-coverts. The primaries are umber-brown barred with yellowish brown; the tail is similarly barred. The upper part of the breast is marked by an indistinct band of brown and white, while the breast and flanks are greyish white with clove-brown striations. The legs and toes are sparsely covered with bristle-like feathers, and the irides are pale yellow. The prototype plumage is of a dull white, the mesoptyle dress of a reddish grey, clouded with white. [W. P. P.]

**2. Distribution.**—At the present time this species is well established as an increasing resident in southern England and Wales, but it owes this position entirely to artificial means, large numbers having been imported and turned down by Lord Lilford and others. Apart from this, a few of the earlier occurrences may have been those of genuine wanderers to our shores. On the Continent the western form, *A. noctua noctua* (Scop.), is found south of the Baltic and North Seas, through Central Europe to the Mediterranean, while other sub-specific forms occur in Northern Africa and Western Asia. For a detailed account of its spread in Great Britain from the two main centres of introduction in Northamptonshire and Kent, see H. F. Witherby and N. F. Ticehurst in *British Birds*, i. pp. 335-42. At that time it was known to breed in the following counties—Northampton, Bedford, Hertford, Huntingdon, Cambridge, Rutland, Leicester, Kent, Surrey, Hampshire, and Sussex; besides occurring, in some cases under circumstances which pointed directly to breeding, in Yorkshire, Essex, Buckingham, Berks, Oxford, Suffolk, Norfolk, Nottingham, Lincoln, Derby, Stafford, and Salop, as well as from Anglesey, Scotland, and Ireland. Since that date further information has come to hand, from which we now know that it has bred in Derbyshire, Yorkshire, and probably also in Oxfordshire, while it has occurred in Gloucester, Warwick, Wilts, and Cheshire. [F. C. R. J.]

**3. Migration.**—Resident as a naturalised British bird, and probably also an occasional visitor from the Continent in the natural course of events. Apart from the districts in which it now breeds, it has occurred in many parts of England and Wales, and once each in Scotland and Ireland (cf. Saunders, *Ill. Man. B. B.*, 2nd ed., 1899, p. 301; and Witherby and Ticehurst, *British Birds*, i. pp. 315, 335-42, etc.). Most of these records doubtless refer to birds of the introduced stock, and it is sometimes disputed whether the species ever visits the British Isles in the natural way. It must certainly be admitted that on the Continent the little-owl is known to be very little addicted to migration: on Heligoland, for instance, its



occurrence has been only once recorded (cf. Saunders, *loc. cit.*; and Gätke, *Vogelwarte Helgoland*, Eng. trans., 1895, p. 192). [A. L. T.]

4. **Nest and Eggs.**—Like the other owls, this species makes no nest, but deposits its eggs in a hole of some sort: often in a hollow oak or other tree, but also at times in buildings or walls, and also in quarries or crevices of rocks, and occasionally in holes in the ground, rabbit burrows, under woodstacks, etc. (Pl. 84.) Here its eggs are laid, to the number usually of 4 or 5, occasionally 6 or even 7. They resemble other owls' eggs, but are the smallest of our British breeding species. (Pl. E\*.) Average of 100 eggs,  $1.34 \times 1.13$  in. [ $34.1 \times 28.7$  mm.]. They are generally laid about the last week of April or early in May, and are apparently incubated by the hen alone, the male often keeping guard from a perch not far distant, and showing great boldness in defence of the nest. Incubation, according to Meade-Waldo and Russ, lasts 28 days, and is performed by the hen alone, who sits very closely. Herr E. Detmers (*Zeitschrift für Oologie*, xvii. p. 44) asserts that a bird hatched out two young in a cage in 16 days after the laying of the first egg! One brood is reared during the season. [F. C. R. J.]

5. **Food.**—Although the smallest of our resident owls, the little-owl is a bold and even at times savage species, and is more prone to feed by daylight and to attack small birds and game than the other owls. A small series of pellets from Northamptonshire, examined by L. E. Adams, gave the following results:—Field-vole, 8; shrew, 7; longtailed field-mouse, 2; rat, 1; rabbit, 1; and beetle, 1. Von Schweppenbourg's results are as follows:—Voles, 81.80 per cent.; mice, 8.80 per cent.; birds, 3.20 per cent.; bank-vole, 2.90 per cent.; shrews, 1.80 per cent.; rats, .30 per cent.; bats, .30 per cent. Remains of pigeons were also discovered, and in England it has been known to take pheasant chicks from the rearing-ground, while Mr. Meade-Waldo has observed it collecting earthworms from lawns in the evening. [F. C. R. J.]

6. **Song Period.**—Is most vociferous during the breeding period. [W. P. P.]

## SNOWY-OWL [*Nyctea nyctea* (Linnæus); *Nyctea scándiaca* (Linnæus).

Catyogle (Shetlands). French, *harfang*; German, *Schnee-Eule*; Italian, *civetta della neve*].

1. **Description.**—The snowy-owl may be distinguished from all other owls by its large size and white plumage, more or less closely barred with dark brown. The female is larger than the male. (Pl. 83.) Length, male, 23 in. [ $584.20$  mm.], female, 26 in. [ $660.40$  mm.]. Iris golden yellow. The closeness of the barring in



the plumage is reduced with age, especially in the male. But it appears to be a variable character, some individuals being much barred throughout life, while in others the bars almost completely disappear. The "ears" are always very short and inconspicuous. The feet and toes are closely feathered; the soles of the feet are also feathered. The first nestling down (protoptyle) plumage is of a sooty brown colour, the second (mesoptyle) is barred. [W. P. P.]

**2. Distribution.**—A circumpolar species, breeding principally in the Arctic regions of the Old and New Worlds. In Europe it is occasionally found nesting on the fjelds of Northern Norway, Sweden, and Lapland, and in the Kola Peninsula, but chiefly during Lemming years and at irregular intervals. It also breeds on the tundras of North Russia, and is said to have nested as far south as the governments of St. Petersburg, Perm, and Orenburg, as well as in Livonia (Russow). It has frequently been known to breed on Novaya Zemlya, and apparently on Waigatz, Jan Mayen, Franz Josef Land, and probably Spitsbergen, but not on Iceland, though it is found in Greenland and in the Arctic regions of Asia and North America. The most northerly breeding-place on record is in Grinnell Land, lat.  $82^{\circ} 33'$ . Although its normal winter quarters lie in the high north, it has occurred as a rare straggler to France, Holland, Germany, Switzerland, Lower Austria, the Black and Caspian Seas in Europe; while it has occurred as far south as Texas in N. America, and Persia and Peshawur in Asia. [F. C. R. J.]

**3. Migration.**—A winter visitor, in very small numbers, from its Arctic summer quarters. To Shetland and Orkney "it is now known to be an almost annual visitor in the cold season, especially after northerly gales; while its occurrence in the Outer and Inner Hebrides, as well as on the mainland of Scotland, is by no means unusual" (Saunders, *Ill. Man. B. B.*, 2nd ed., 1899, p. 303). There are also numerous records from various parts of England and Wales, notably from the northern, south-western, and East Anglian districts, and the species has also been frequently recorded from Ireland (cf. Saunders, *loc. cit.*; Ussher and Warren, *B. of Ireland*, 1900, pp. 117-18; and Witherby and Ticehurst, *British Birds*, i. p. 315, and ii. p. 412, etc.). Evidence of a gregarious tendency on migration may be found in the statement that "a flock, perched on the spars of a vessel, has voyaged from Labrador half way to Ireland" (Saunders, *op. cit.*, p. 304). [A. L. T.]

**4. Nest and Eggs.**—Does not breed in the British Isles. [F. C. R. J.]

**5. Food.**—In the high north the food of this species consists of such species as the lemming and other rodents, the Arctic hare, ptarmigan, willow-grouse, ducks, little auks, and other species of sea-birds. It has also been known to take



fish (Audubon). In the British Isles it subsists chiefly on rabbits, but will take birds of many species, mice, and even beetles and spiders (cf. Saxby, *Birds of Shetland*, p. 50). [F. C. R. J.]

**6. Song Period.**—Is most vociferous during the breeding season. [W. P. P.]

*The following species and sub-species are described in the supplementary chapter on "Rare Birds" :—*

Darkbreasted barn-owl, *Strix flammea flammea* Linnæus, *Tyto alba guttata* (Brehm).

Tengmalm's owl, *Nyctala tengmalmi* (Gmelin).

European hawk-owl, *Surnia ulula ulula* (Linnæus), [*Surnia funerea* (Linnæus)]; and

American hawk-owl, *Surnia ulula caparoch* (P. L. S. Müller).

Scops owl, *Otus scops* (Linnæus), [*Scops giu* (Scopoli)].

Eagle-owl, *Bubo bubo* (Linnæus), [*Bubo ignavus*, T. Forster]. [F. C. R. J.]



## OWLS

[W. P. PYCRAFT]

Among our native birds few have been so greatly maligned, so hopelessly misunderstood and misrepresented, as the owls, and this, no doubt, largely because of their nocturnal habits, and the strange, unearthly noises to which some give vent. By our forefathers, who lived in an atmosphere saturated with superstition, the owls were reviled as birds of ill omen, portending death and lesser evils; to-day, in an age which prides itself in its "strong common sense," they fare scarcely better. They no longer inspire fear, but hatred reigns in its stead, and this because it is believed that these birds are the enemies of "game." The game-preserve and the gamekeeper are their most relentless enemies, though happily there are signs of enlightenment on the part of both, which is well for all concerned. Were the owls afforded the protection they deserve, rat and vole plagues would be unheard of. In the United States the value of the owl was long ago realised. Recently Mr. C. W. Beebe, of the New York Zoological Society, remarked, "Only in the last few years, when our grain crops reach from ocean to ocean, and the devastations of hordes of mice have touched one of the deepest chords of man's nature—his purse—is the owl getting due credit for his value and economic importance. If every owl on our continent was suddenly swept out of existence, it is doubtful if, after a few years, a single crop of grain would be reared successfully. It would take the mice and other rodents, and many injurious insects, but little time to confine all their ravages to the hours of darkness. Hawks would, in such an event, become useless to man, and though weasels and minks might increase prodigiously, yet, without the deadly swoop of the owl, the mice would soon overrun the land."

By the systematist the owls have been no less misunderstood,



though this fact has brought them no ill. Till recently they were regarded as belonging to the "Birds of Prey," which were, accordingly, divided into the "diurnal" and "nocturnal," the owls forming the latter. As a matter of fact, though they are indubitably "birds of prey," they are, nevertheless, in no way related to the so-called "diurnal" birds of prey now known as the *Accipitres*, being much more nearly akin to the nightjars and "frog-mouths."

The two most characteristic features that distinguish them as a group are the strange softness of the plumage,<sup>1</sup> which extends even to the quill feathers, which, like muffled oars, impart a peculiarly silent flight—a feature of the highest importance to birds which must surprise an ever alert and agile prey, hunted, for the most part, during the twilight hours—and the curious arrangement and structure of the feathers surrounding the eyes, forming the "discs" with which all of us are familiar. In the upright carriage of the body, the form of the beak, and feet, these birds, indeed, closely resemble the *Accipitres*, but this resemblance is due to "convergence" and not to descent.

As touching the structure of the foot, it must be remarked that, while closely resembling the foot of an accipitrine bird, it differs in the greater mobility of the toes. When perching, the toes have the zygodactyle arrangement—two in front and two behind; when grasping prey they radiate as it were from a common centre: when the bird is on the ground, however, the toes have the typical avian arrangement—three in front and one behind. Only one or two *Accipitres*, e.g. the osprey, are able to turn the outer toe backwards, and on this account, until recently, the osprey was held to form the connecting link between the *Accipitres* and the owls.

The eyes of Owls are relatively larger than those of any other birds, a fact explained by their nocturnal habits. In them, as in the eyes of the *Accipitres*, the ring of bony plates, "sclerotic plates," which surround the eyeball is extremely well developed, and plays an important part in rapidly focussing the eye; further, they are so lodged

<sup>1</sup> Which they share with the Nightjars.



in the socket as to be practically incapable of notatory movement, and hence the whole head has to be turned in the direction of the object to be scanned. In colour, as in the *Accipitres*, they are either yellow—*e.g.* longeared and eagle owls—or of a dark hazel, so as to appear black—*e.g.* barn-owl, tawny-owl. The nictating membrane, or curtain, which is incessantly drawn over the eyeball, is well developed, as it is in the *Accipitres*. But the Owls differ from other birds in that the upper lid, as in ourselves, closes the eye, instead of the lower.

The young of the Owls, as with the *Accipitres*, are nidicolous—that is to say, they remain long in the nest helpless, and must be fed by the parents. They are also daring, as with young *Accipitres*. But while it is now known that the young owls develop two generations of nestling down, as much cannot yet be certainly said of the young of *Accipitres*. These two generations are known as the *protopstyle* and *mesopstyle* generations.<sup>1</sup> In the barn-owls, for example, the *protopstyle* down is vestigial, and the *mesopstyle* degenerate, while in the eagle and tawny owls the *mesopstyle* down is extremely well developed, being semi-plumous in structure, and transversely barred, a pattern rare, indeed, in such plumage outside the Owls. The *mesopstyle* generation of down lasts in the tawny-owl for about eight weeks, when it is replaced by the contour feathers, the quill and tail feathers having meanwhile appeared. In *Accipitres* the nestling down is composed both of down which is later replaced by down in the adult, and is thus called *pre-plumulæ*,<sup>2</sup> and down which is later replaced by contour feathers, and hence is called *pre-pennæ*. In the Owls, on the other hand, *pre-pennæ* alone are present, the adult owl having no down feathers. Further, we may remark, in the *Accipitres* the oil-gland is tufted, but not so in the Owls.

<sup>1</sup> Pycraft, *British Birds*, vol. i. p. 162.

<sup>2</sup> Pycraft, "Morphology of the Owls," *Trans. Linn. Soc.*, 1898.



## BARN-OWL

Of the eleven species in the British list, only four are resident and common, though the little-owl, which has been introduced in some numbers during recent years, has become plentiful in certain counties. Our resident species, happily, embrace representatives of both of the two families into which the *Striges* are divided. Of these two families one is represented by the barn-owl alone, the other containing all the remaining species. The reasons for these divisions will be given later on in the course of this work. Suffice it to comment on two of its more striking characteristics. In the first place, the facial disc is extremely well defined, and, unlike that of other owls, is during sleep curiously contracted, the segment of the disc beneath the eye being drawn upwards. It is also conspicuously long-legged, and the claw of the middle toe is serrated, as in the nightjar and many other quite unrelated groups. This is a character which, so far, has defied interpretation, and, it is to be noted, is not present in nestlings.

That the barn-owl is cosmopolitan is easily understood, since it shows a greater adaptability as to haunts and breeding-places than any other owl. Thus it finds comfortable accommodation alike in church towers and belfries, farm and other outbuildings, dovecots, hollow trees, and clefts in walls and cliffs; it seems indeed, unlike other owls, to display a preference for human habitations, and to establish itself wherever man has founded a settlement, and this probably because man, in his wanderings, is always closely followed by the ubiquitous mouse and rat, which form the staple food of the barn-owl. It is the only one of our native owls which displays such friendliness to man and preference for human habitations—hence the name barn-owl—and this in spite of the fact that this trustfulness is so commonly misunderstood, bringing death as a consequence.

Though it will occasionally venture forth to hunt by day, even at



midday during hot summer weather—statements to the contrary notwithstanding—it is by choice a nocturnal bird : and these excursions during the day are the exceptions, not the rule. As twilight falls it emerges from its hiding-place to search the hedgerows, lanes, orchards, and enclosures near outbuildings, quartering the ground like a dog, in search of field-mice, rats, and shrews, though insects, occasionally sparrows roosting in ivy, bats, and even fish are taken. It has been stated, again and again, that shrews are not eaten, but we have the testimony to the contrary of observers like Montagu, Macgillivray, Gilbert White, and Waterton ; while the matter can be settled at first hand by any who will take the trouble to examine a number of pellets taken from the sleeping-quarters of one of these birds ; for, like other owls, the *Accipitres* and many species not generally credited with the habit, they eject, in the form of pellets, the indigestible portions of their food, such as skin and bones. The late Dr. Bowdler Sharpe has left on record some interesting notes on the barn-owl. He had frequent opportunities of studying this bird at Avington Park, Hampshire, the seat of Sir Edward Shelley. “I have seen,” he remarks,<sup>1</sup> “two and three of these pretty birds flying about in the early evening, over the bracken, and playing with each other in the air. Their movements were full of grace and activity as they sailed over the ferns and gambolled with each other in the most playful manner. The number of mice which a barn-owl catches in a single night is truly astonishing. Waterton says that the birds will bring a mouse to their nest every twelve or fifteen minutes, and a nest in Avington Park was found by us to have over forty freshly killed field-mice, which must have been caught during the preceding night.” Seebohm gives an instance of twenty rats found in a similar situation.

This matter of the part played by the barn-owl in keeping down rats and mice is one which, even to-day, is not properly appreciated. For years past this bird has been wantonly and brutally slain in the supposed interests of game-preserving. But for this the recent serious

<sup>1</sup> “British Birds,” Lloyd’s *Natural History*, vol. ii. p. 110.



Plate 80

Barn-owl hunting

By A. W. Seaby















outbreak of plague spread by rats would never have occurred. The engines of destruction have been the gun and the pole-trap, the latter a means unworthy of a "sportsman." But, lest we be accused of sentimentality, let us cite the opinion of others, whose authority to speak cannot be questioned. Thus, then, Mr. R. B. Lodge<sup>1</sup> quotes the following passage from the late Mr. Cordeaux, a well-known ornithologist of his time, whose work still lives: "The owls (shorteared-owls) have been exterminated by the keepers with their deadly pole-traps—a cruel form of bird murder which no humane person would tolerate or adopt. . . . The useful barn-owl, too, has been ruthlessly destroyed whenever opportunities offered in this same cruel fashion. Noiselessly across the waste in the twilight . . . comes the soft-winged owl, and seeing, as if placed ready for his use, a post of vantage from which he may mark each stealthy movement of the mischievous field-vole, stays his flight to settle on the treacherous perch; and then, during all the long night, and too often, we fear, through the succeeding day—with splintered bone protruding through smashed flesh and torn tendon, hangs suspended in supreme agony, gibbeted head downwards till death puts an end to his sufferings. Well may we ask, Can all the game-preserving in the world justify this ignorant and needless wrong?" Similarly, Mr. W. B. Tegetmeier,<sup>2</sup> for so many years on the staff of the *Field*, wrote: "The utility of the owl (barn-owl) is illustrated by [the late] Lord Lilford with a very amusing anecdote. He states that when he was a schoolboy he had a half-grown barn-owl that he regaled on one occasion with as many mice as it would swallow. Eight disappeared in quick succession down the capacious gullet of the owl, the ninth followed all but the tail, which for some time hung out of the bird; but the quick digestion of these *Raptores* is well illustrated by the fact that in three hours the owl was ready for a second meal, and took four additional mice.

"If this is the performance of a single bird, the effect that the feeding of nests of six or seven young would have on the numbers of

<sup>1</sup> *Pictures of Bird Life*, p. 149.

<sup>2</sup> *Field*, 1890, 906.



rats and mice in a district is self-evident. Lord Lilford says that he has seen a pair of barn-owls bring food to their nest no less than seventeen times within half an hour. This rate, if continued for only four hours out of the twenty-four, would give (if we include the animals eaten by the old birds themselves) more than 150 'rats and mice and such small deer' destroyed daily for the support of one nest of owls. Is it surprising that vermin abound where their natural enemies have been exterminated by farmers, and gamekeepers, and plumassiers? At this present time, when a plague of rats infest many districts of the country, I need make no excuse for quoting the experience of so sound and practical an ornithologist as the President of the B.O.U. on the utility of the barn-owl." These words of Mr. Tegetmeier are as true to-day, unfortunately, as they were twenty years ago, for even now these unfortunate birds are only protected by a few of the more enlightened and better informed farmers and game-preservers. St. John, in his most delightful *Wild Sports of the Highlands*, cites an instance where owls having been nearly destroyed by numerous pole-traps placed about the fields for their destruction, as well as for the equally brutal destruction of hawks, rats and mice increased to such an extent on the disappearance of their worst enemies, and committed such havoc among nursery gardens and farm buildings, that the proprietors were obliged to have all pole-traps taken down. As a result, the pests disappeared in proportion as the owls and hawks increased.

Game-preservers, however, are not all dead to the value of the barn-owl and its relatives. Thus Mr. J. H. Gurney writes:<sup>1</sup> "My keeper has had two kestrels', one sparrow-hawk's, one tawny-owl's, and two barn-owls' nests within half a mile of his 300 young pheasants, which the sparrow-hawks have not touched." He cites the sparrow-hawk because this bird is the one most likely to be troublesome to the game-preserver. Mr. Heatley Noble, another ornithologist of repute, gives similar testimony in the *Zoologist* for 1900, p. 423.

The chosen retreats which shelter the barn-owl during the day

<sup>1</sup> *Zoologist*, 1901, 132.



are also used as the nurseries for the young. The labours of nest-building it dispenses with, the only semblance of such a structure being formed of the cast-up pellets already referred to. In places remote from civilisation, as in Malin Head and Mine Head, Ireland, also in Wales and in California, it herds in cavities in cliffs, and a case is on record where a pair adopted the deserted nest of a crow.<sup>1</sup> The eggs, as in the case of all the owls, are white, and are laid, as a rule, between May and July; occasionally they are found as early as March, or even earlier, and young have been found in the nest as late as November and December. Clutches range in number from six to ten, but the latter number is rare: such clutches have, however, been taken both in England and in California. Doubtless, as in the case of other birds, the number laid depends on the food-supply. Evidence on this head we shall produce presently. The eggs appear to be laid on alternate days, and incubation commences at once. Thus owlets of at least three different stages may be found in the same nursery, the warmth of the earlier birds no doubt materially aiding the development of the unhatched chicks while the parents are abroad on the quest for food. As many as six fresh eggs have been found with these nestlings. As we have already pointed out, the young are clothed, on hatching, in a short white down, which is quickly replaced by a longer, woolly covering, to be thrust out later by the contour feathers constituting the "juvenile" plumage, though this is indistinguishable from that of the adults.

The young, when disturbed, make a loud snoring noise, though this is also emitted, at times, by the adults. The usual note of the old birds, however, is a wild scream. When alarmed, they are silent, save for a curious snapping noise, made under similar circumstances by all owls, by rapidly and forcibly snapping the jaws together, and while this snapping is in progress the body is drooped, and the head bowed down and moved from side to side in a curious and uncanny fashion.

<sup>1</sup> *Birds of Ireland*, p. 115.



So far we have been discussing what we may call the typical barn-owl. But birds of dark or "red" phases of plumage are sometimes met with. These are northern (Danish) individuals, characterised by the large amount of chestnut on the facial disc, red under parts marked by dark "arrow-head" patterns, and darker, greyer upper parts. These birds, however, appear to differ in nowise from the lighter plumaged birds of the British Islands. Of the numerous races and sub-species of this bird met with in various parts of the world, it is not necessary to speak here. But a few words must be said on the subject of "Luminous Owls."

It would seem that under certain circumstances, yet to be discovered, the barn-owl becomes highly phosphorescent, so much so as to produce a glare during flight. This fact was first brought to public notice by Sir Digby Pigott during 1907, when he wrote to the *Times* recording the fact that on the night of February 3, 1907, a Norfolk landowner, Mr. R. W. Purdy of Foulsham, Norfolk, saw, on returning from an evening walk, what he believed to be a moving light, apparently a carriage lamp, about a quarter of a mile off. It suddenly mounted some 50 or 60 feet into the air, moving up and down, vertically, with great rapidity; then it descended and pursued a horizontal course. But during the twenty minutes it was under observation it pursued a very erratic course, and naturally left the observer something more than mystified. In December of the same year similar phenomena were witnessed; and, to make a long story short, this strange moving light was found to proceed from a pair of owls. Mr. Purdy drew the attention of a number of people resident in the neighbourhood to this strange phenomenon, so that there can be no doubt as to the reality of the occurrence. What is wanted is an explanation. It may be due, as has been suggested, to luminous bacteria adherent to the feathers from contact with decaying wood; or to the products of disease, since phthisical patients have been known to become phosphorescent; or it may be due to a fungus not infrequently found in feathers, which, under certain circumstances, becomes luminous. But,



so far, no satisfactory explanation thereof has been found. An able summary, too long for quotation, was given of this subject by Sir Digby Pigott in the *Contemporary Review*, 1908, from which it appears that similar luminous birds have been seen in other parts of England, though of these no detailed or careful records have been given.

## LONGEARED, SHORTEARED, AND TAWNY-OWLS

These three species differ much in their habits, though they all agree in evading, as far as is possible, the neighbourhood of man—thus differing from the barn-owl. In the matter of habitat, for example, the longeared and shorteared forms are the very antithesis of one another, the former agreeing with the tawny and the latter with the snowy-owl. And it was apparently this fact that led Seebohm to divorce the long and shorteared-owls in his *History of British Birds*. This is the more remarkable, since it was his practice to make a great show of considering structural characters—which he never understood—in all his writings. A very little first-hand knowledge of the facts would have shown him the absurdity of such a divorce, and the danger of employing habits as a factor in classification. These two birds, in their pterylosis, the structure of the external ear, their osteology, and anatomy generally, differ one from another only in small particulars; though in their coloration they are less alike. Both, like the eagle and snowy-owls, have “ears” or “horns,” formed of long, erectile feathers, springing from the crown on either side, but in the shorteared and snowy-owls—and especially in the latter—they are very short. These are merely “ornaments.” The species here compared also agree in having the legs feathered down to the toes, and in this particular the tawny-owl is also included.

The longeared-owl, it is to be noted, is a forest lover, and for choice seems to favour plantations of spruce and Scots fir, and it has extended its range in this country in keeping with the increase of



such plantations. Large woods are not essential ; small clumps of firs, or trees bordering forests, are all-sufficient, but old ruins, barns, or outbuildings are shunned. While nocturnal in its habits, it is not affected by the glare of daylight, though in a very strong light it will generally draw the nictitating membrane over the eyes. Like most of its kind, however, it rarely ventures abroad by day, being possibly deterred by its fear of being "mobbed" by all the smaller birds—thrushes, blackbirds, titmice. When at rest it generally stands with the body close to the trunk of the tree, and if suspicious of danger, will hold itself in a strangely upright attitude, drawing the feathers close to the body, and placed as close to the tree trunk as possible. The strangely inanimate appearance thus gained, coupled with the complete harmony of its plumage with its surroundings, and the fact that it is a remarkably silent bird, renders it extremely difficult to detect. This strangely wooden pose, however, is quickly thrown aside when at bay. At such times it becomes transformed into the very incarnation of fury, the body is thrown forward, the wings are opened so that the secondaries are raised high above the back, while the primaries are dropped, and all the other feathers of the body are set on end, producing a truly terrifying attitude, which is heightened by the great glaring, yellow eyes, the snapping of the jaws, and the production of a peculiar swearing sound, recalling the "spitting" or "swearing" of a cat when roused. In all this it reproduces the attitude of the great eagle-owl, and stands in strong contrast with the barn-owl, which seems to content itself with curious, waving, side to side movements of the lowered head and neck.

With the twilight the long-eared-owl emerges to hunt, its prey being furnished by rats, mice, voles, shrews, small birds caught as they flit by, as well as beetles and other insects. As might be supposed, the young fare as their parents.

This bird neither sleeps nor breeds in hollow trees, like the barn and tawny owls, neither does it build a nest, but adopts some deserted squirrel's drey, or the forsaken nest of a crow, heron, wood-pigeon, or



Plate 81

Longeared-owl feeding its young

By Winifred Austen















sparrow-hawk. In such a nursery from four to seven eggs are laid, which, according to the usage of owls, are incubated as soon as laid, hence young of different ages and sizes are found in the same nest. What we may call aberrations in the selection of a site for a nursery are rare, but instances of nesting on the ground have been recorded. One such instance was given by Mr. C. F. Archibald,<sup>1</sup> who found a nest at Ulverston, under a tiny Scots fir, among the heather, in peat moss, containing two eggs. This was on May 3, 1901. When visited again on the 16th of the same month the eggs had vanished. But three days later a second was found, about one hundred yards from the first, and in an exactly similar position. This contained four eggs, from which three were hatched. To make certain that no mistake had occurred, one young bird was kept, and thrived in captivity. This curious choice of a site is the more remarkable since there were plenty of suitable trees close at hand. Normally, however, the site chosen for a nursery is about twenty or thirty feet high, occasionally as low as twelve feet, or as high as forty feet from the ground.

The young have a curiously discordant note, which has been compared to the creaking of a gate swinging on unoiled hinges; while the adults, though, as we have remarked, usually silent birds, have yet cries to represent varying moods. Thus they are said to make a silvery chirruping note, like the shaking of a small bag of silver coins, just as they are beginning to sally forth for the night, and as a greeting. The young also are said by the same observer<sup>2</sup> to make the same note when food is brought to them. The female when alarmed, or angry, as when the young are threatened, makes a loud noise, likened to *kyak*, or described as "quacking." But its most interesting notes are those heard mainly early in the year. These are the nuptial calls, and sound like *oo* long drawn out, and persistently repeated. At this season, too, the male gives vent to strange moaning sounds, made, it would seem, when on the wing, and accompanied by a strange percussion of the wings brought smartly over the back, as in

<sup>1</sup> *Zoologist*, 1901, 31.

<sup>2</sup> C. H. Bryant, *Zoologist*, 1905, 265.



the case of wood-pigeons, but owing to the peculiar softness of the quills in the owl the sound is muffled and is like "*bock*." The nightjar makes a similar, but sharper, sound. While this curious and most unexpected note is being made, the bird will often fling himself about in the air as if in play.

That the long and shorteared-owls are closely related must be evident from the remarkable structure of the aperture of the ear, described later in this chapter (p. 411). As much might be inferred from the general superficial likeness of the two birds, though the longeared species is decidedly a "smarter" bird to look at. The shorteared species, by comparison, has a "dowdy" appearance, lacking, for one thing, sharpness of definition in the longitudinal stripes, which had no transverse barrings. But they differ, as we have already hinted, still more widely in their habits, for the shorteared-owl is a ground-dweller, haunting meadows, turnip-fields, commons, furze-brakes, sedgy marsh-land, and fens. Moreover, it is a more markedly migratory species than the longeared-owl, arriving in considerable numbers, and in companies, in the autumn, at about the same time as the immigrant woodcock, on which account it is commonly known as the "woodcock-owl." Whether, as is the rule among migrants, they fly at a considerable height when crossing the sea is not known, but they certainly adopt the practice of descending when near land, and this to a lower level than the woodcock, inasmuch as, on the Lincolnshire coast, for instance, they are commonly taken in the nets stretched along the shore at a height of about two feet from the ground, while the woodcock are never so captured. The shorteared-owl returns northwards in spring to breed, and these birds, it is possible, may some day be discovered to be distinguishable from our resident, breeding birds, though these are becoming fewer annually. Nevertheless, a remnant of this ancient breeding-stock remains, and in suitable localities a few succeed in rearing broods annually. At times the number of these breeding birds is considerably augmented, as on occasions when, either from the too persistent persecution of



their enemies, or from an unusual succession of years of plenty, voles (*Microtus agrestis*) increase in such numbers as to become a plague in the land, when, it would seem, numbers of the birds which would otherwise have passed northwards in the spring to their usual breeding haunts remain with us, tempted by the abundance of food concentrated in the infested areas. Such vole plagues, in these islands, are happily of infrequent occurrence, but records of such visitations extend back over more than three hundred years. Kent and Essex were so stricken during 1580-81; Essex again in 1648; Hilgay, in Norfolk, in 1754; and the south of Scotland and north of England in 1890-92. The alarming character of such outbreaks may be gathered from the records of 1890-92, when all that human ingenuity could suggest proved unavailing. In Selkirkshire some thirteen thousand were killed in three months by men armed with wooden spades, and in Glenkerry no less than fifteen thousand were killed in one month by similar means. Meanwhile the owls—and kestrels—thronged to the scene. The former displayed a remarkable fecundity under the stimulus of this plenty. Normally laying from four to eight eggs, clutches of thirteen now appeared, and at least two broods were reared by the majority of breeding birds. Thus, before the end of the plague, no less than four hundred pairs of shorteared-owls alone were finding sustenance in the stricken area. A small wood within the stricken area is described as presenting a most remarkable appearance, the ground being densely covered with the pellets ejected by the owls, containing the bones and fur of the pests.

This flocking of the owls, and their abnormal fecundity, furnishes a most striking illustration of the way the balance of nature is maintained. Furthermore, it has an interesting sequel, which makes doubt as to the sequence of events impossible. For when the voles became reduced to their normal numbers, and no other source of food was discovered as a substitute, the ranks of the owls became speedily reduced by starvation, and large numbers were picked up dead on the former scenes of plenty. Many, doubtless, escaped by migration, and



the fact that some did not is fraught with deep significance, throwing an unexpected light on that most difficult of problems, the migratory instinct. This must undoubtedly have been deficient in a certain percentage of these birds, and this, too, although the species is an eminently migratory one. "Lemming years" in Scandinavia are attended with a similar increase in the number of this owl. But though we seem to have no records dealing with the point, it seems probable that this increase is not attended with a similar mortality, since the venue of the plague slowly changes and is extended over a large area. The owls follow their food. Since, however, the ultimate destination of these migrating hosts is said to be the sea, all participating in this tremendous march ultimately perishing, there must, when this consummation takes place, be a similar elimination of the birds with the non-migratory instinct. On this head, however, no observations appear to have been made.

Small mammals do not, however, constitute the only food of the shorteared-owl, for I myself have frequently found numbers of the common dorbeetle (*Geotrupes vernalis*) in the crop and gizzard of these birds, and bats, reptiles, and fish are also included in its dietary.

Of the habits of the shorteared-owl prior to mating nothing seems to be known. In their manner of nesting, as we have already hinted, they differ conspicuously from the nearly related longeared-owl; haunting, as we have already seen, treeless areas, they breed, as might be supposed, like the snowy-owl, upon the ground. Nest-building may be, and often is, dispensed with altogether, the eggs being laid in a depression in the ground, generally ready-made. But the Rev. F. C. R. Jourdain tells me that he has found that in sandy soils the bird scratches a hollow for herself. Sometimes two or three may be found close together—perhaps representing more than one year's nesting-place. But it is instructive to notice that this hollow may be lined with grass, or dry, broken leaves of sedges, and occasionally a feather or two. Seebohm, when on an egg-hunting raid in the Norfolk Broads district, had the good fortune to examine the nests



of two birds—which, on account of the draining of the marsh lands, and the rifling of nests by egg-collectors, have become very rare in East Anglia. In one case the female hovered at a considerable height over the nest, “as if she would assure herself we had not taken her eggs. . . . When she had apparently adjusted the focus of her great eyes upon them, she fluttered her wings in a very agitated manner for a few seconds; whether this peculiar movement was the result of her great anxiety to return to cover them from the chill evening air, or an active expression of her delight at seeing them still in the nest, or an attempt to attract our attention in order to lure us away from the spot, it is difficult to determine.” It could scarcely have been from the last-named motive, or she would not have hovered directly above them. The bird’s silence on this occasion is remarkable, for, as the Rev. F. C. R. Jourdain, writing to me on this theme, remarks: “The shorteared-owl is the one British species which is really noisy when its young are approached. The others snap their bills, and give other signs of distress, but do not utter a note, while the shorteared-owl rises high in the air, even in bright sunshine, and sails overhead uttering from time to time an angry bark, which Coward syllables ‘*whowk*,’ ‘*whowk*.’ When the young are approached or handled the notes are even more angry, and sound almost like ‘*quack*.’ Of course less excitement is shown when they have eggs.”

The tawny-owl affords some striking contrasts with the species already described. Like the longeared-owl it is a wood-haunting species, that is to say, it resorts thither to breed, and seeks seclusion therein by day throughout the year. But at nightfall it emerges to hunt, preying upon mice, voles, rats, shrews, moles, and beetles, while occasionally this diet is varied by fish caught as they swim near the surface, or from the bed of shallow brooks. The barn-owl and the snowy-owl, as we have remarked, will also occasionally turn fisherman. But fishing is possibly only resorted to when other food is, for a time, scarce. This habit, however, loses something of its strangeness when



we remember that the fishing owls of Africa and East Asia feed mainly on fish, and the better to hold such slippery prey, the soles of the feet, as in the osprey and fish-eating eagles, are provided with rough-pointed scales. Birds are occasionally eaten, but probably they fall victims only when roosting in exposed positions, or when suddenly startled they seek safety in flight.

Though agreeing so closely with the longeared-owl in its mode of life, it differs in one striking particular—the rounded shape of the extended wings, due to reduction in the length of the outer primaries. This peculiarity is theoretically what we should expect of a bird which haunts the woods, but the hunting grounds of this bird are generally supposed to be outside the woods. Further investigation may show that at least a part of its food is obtained within the wood itself, thereby avoiding, or rather reducing, competition with its neighbours. This being so, the rounded wing becomes explicable as one more suited to flight amid branches and foliage. The shape of the wing may also be related to the fact that it breeds in hollow trees, though occasionally, like its neighbour the longeared-owl, it will utilise the deserted nest of a wood-pigeon, or a squirrel's drey.

Of its courting habits practically nothing seems to be known. But C. H. Bryant has recorded the fact that, like the longeared-owl, it claps the wings over the back, producing the same curious sound like "*bock*," and this noise is accompanied by a loud prolonged laughing cry like that of a peregrine when its nest is threatened. The tawny-owl is, however, the noisiest of all our owls, and is the bird which is popularly supposed to cry "*tu-whit, tu-whoo*." As a matter of fact, the consonant is never uttered, and the cry is more nearly rendered as a quavering "*o-oooo*." After a pause of three or four seconds this is followed by a long, quavering "*oo-oo-oo-oo-oo-oo-oo-oo!*"—then about forty seconds and the whole theme is repeated. Both sexes hoot, while the young and adults, at dusk, keep up a constant and sharp "*e-wick, ee-wick*."

Young tawny owls, in their first plumage, are commonly dimorphic,



Plate 82

Tawny-owl mobbed by small birds

By G. E. Lodge















that is to say, they present both a grey and a red phase of plumage (p. 382), but it will probably be found that this red, or "hepatic," phase is retained throughout life, though this is not true of the cuckoo, which presents a similar dimorphism. The female is always inclined to rufous: indeed, the tawny-owls of this country are markedly more rufous than those of the Continent, even those of the "grey" phase.

Like the rest of its genus, the tawny-owl has unusually large eyes, in consonance with its more strictly nocturnal habits; and, further, the iris is of an extremely dark brown, so that the eyes are commonly described as black, and in this coloration the tawny agrees with the barn-owl, and the rim of the eyelid has a curious pink colour, adding a curious effect to the bird's appearance. But in the majority of owls the iris is yellow, generally of a rich golden yellow, and it would seem that in cases where the iris is of this bright hue the birds are less strictly nocturnal. This connection between the colour of the iris and nocturnal habits cannot, however, be pushed very far, for the barn-owl will hunt by daylight: and we get a similar diversity in the colour of the iris among the *Accipitres*, which are all diurnal, since the falcons and eagles, for example, have a brown iris, while most of the other *Accipitres* have a yellow iris. Another peculiarity of the owls so far described is the fact that the outermost quills have the outer webs curiously serrated; whether this in any way contributes towards the silent flight is doubtful. Finally, we come to the most remarkable of all the external character of these owls—to wit, the structure of the external ear, which presents certain puzzling features which neither the anatomist nor the field ornithologist has succeeded in interpreting; indeed, the riddle seems insoluble, though it may prove to be associated with the extremely acute sense of hearing which these birds seem to possess. Briefly, in many owls, *e.g.* *Speotyto*, the external aperture of the ear differs in no wise from that obtaining in other orders of birds—that is to say, it presents a simple round hole guarded by stiffened feathers with few barbs. In the eagle-owls and *Scops* this aperture is conspicuously enlarged. But in the



tawny-owls, *Syrnium*, this aperture is not only relatively much larger, but the skin bounding its anterior margin has been produced to form a broad flap or "operculum," which can be drawn over the aperture, closing it completely (Fig. 2, Op.). Further, if the two sides of the head be carefully examined, it will be found that the aperture on the right side of the head is larger than that of the left; and, as we shall show presently, this asymmetry is by no means confined to the species of this genus. The aperture is so large that the side of the skull-wall, and the sclerotic plates of the eye, are exposed when the operculum is raised, the actual meatus, or opening of the ear lying in the lower segment of the great oval opening formed by the skin. (Figs. 2 and 3, M.E.). In the long and shorteared-owls the size of this opening attains its maximum. In the owls of the genus *Otus* the inferior border of this aperture is continued downwards and forwards to the gape, and upwards, backwards, and forwards in a great sweep to the top of the eye, and a correspondingly enormous operculum is developed in consequence. (Fig. 1.) But this is not all. From the middle of the inner surface of the operculum there runs backwards to the thin sheet of skin covering the cranial wall a long pulley ensheathed in a band of skin. Thus on raising the operculum a great space is revealed, exposing a large part of the cranium, the hinder part of the lower jaw, and the hinder wall of the eyeball. Behind the latter is a large crescentic cavity divided into an upper and a lower chamber by the band of skin running backwards from the operculum. Carefully examined, this upper chamber on the right side of the head will be found to be "blind," while in the floor of the lower chamber will be found the meatus already referred to. On the left side of the head the relations of these chambers is exactly reversed, the meatus opening into the chamber *above* the pulley. Here, again, we have an instance of asymmetry. What advantage the extraordinary development of the external ear confers, or what function it performs, is so far an insoluble riddle. It would seem, and this is merely supposition, that this curious development forms a kind of ear-trumpet, for the hinder



Fig. 1.

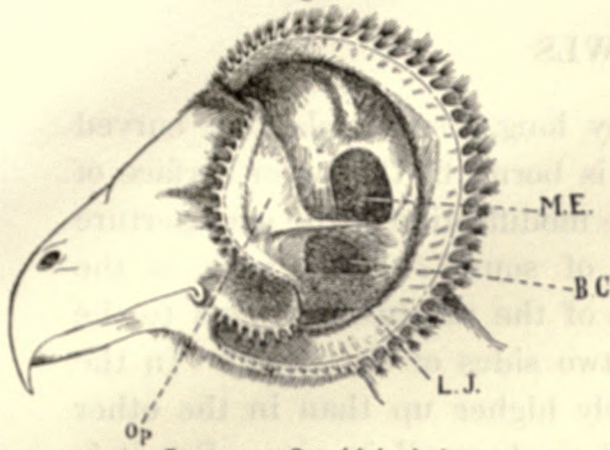
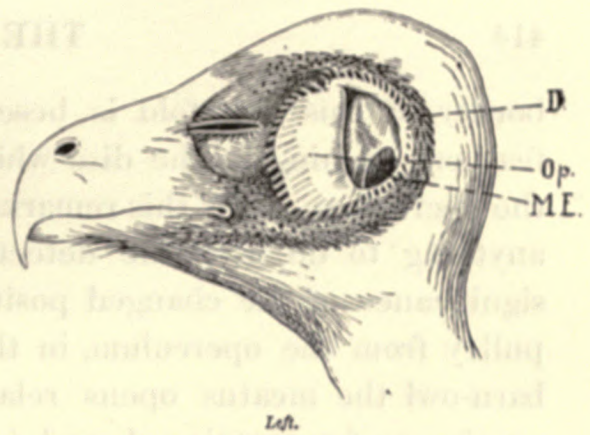
LONG-EARED-OWL (*Asio otus*).

Fig. 2.



Left.

Fig. 4.

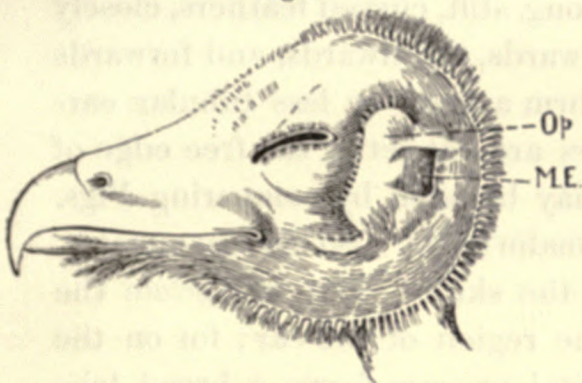
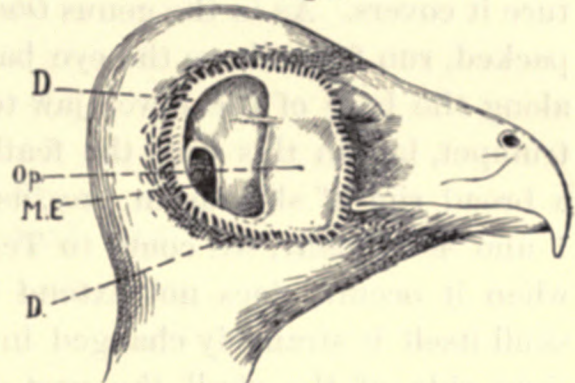
BARN-OWL (*Strix flammea*).

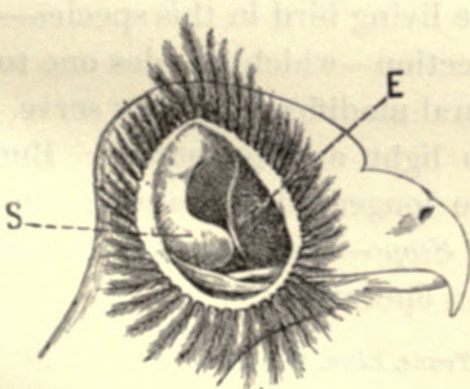
Fig. 3.



Right.

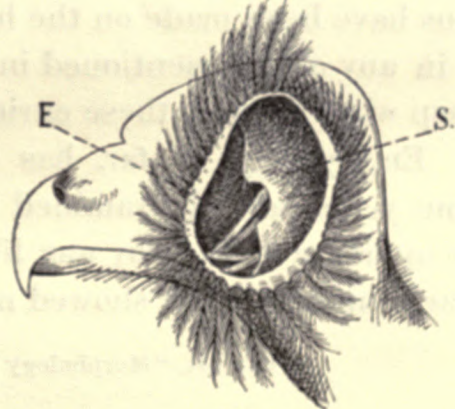
TAWNY-OWL (*Syrnium aluco*).

Fig. 5.



Right.

Fig. 6.



Left.

TENGMALM'S OWL.

Heads of various Owls to show the form of the external aperture of the Ear.

B.C. = Blind-cavity.

D = Disc feathers.

E = Eye.

L.J. = Lower jaw.

M.E. = External ear aperture.

Op. = Operculum.

S = Skull.



border of this skin-fold is beset by long, closely planted, curved feathers, framing in the disc which is borne by the outer surface of the operculum. Has this remarkable modification of the ear aperture anything to do with the detection of sound? And what is the significance of the changed position of the meatus, in regard to the pulley from the operculum, in the two sides of the head? In the barn-owl the meatus opens relatively higher up than in the other species so far mentioned, and is relatively small in size. But it is also protected by an operculum which is much larger than the aperture it covers. As in the genus *Otus*, long, stiff, curved feathers, closely packed, run from above the eye backwards, downwards, and forwards along the base of the lower jaw to form a more or less tubular ear-trumpet, but in this case the feathers are not set in the free edge of a broad rim of skin as in *Otus*, as may be seen by comparing Figs. 1 and 4. Finally, we come to Tengmalm's owl. So far asymmetry, when it occurs, does not extend to the skull. But in *Nyctala* the skull itself is strangely changed in the region of the ear; for on the right side of the skull the post-orbital process forms a broad lobe extending forwards to the eyeball, while on the left side of the head the skull-wall is deeply notched. (Figs. 5 and 6.) So far no observations have been made on the habits of the living bird in this species—or in any others mentioned in this connection—which enables one to grasp what purpose these curious structural modifications may serve.

Embryology, so far, has thrown no light on the matter. But some years ago<sup>1</sup> I examined an embryo longeared-owl, and in this the aperture of the ear was like that of *Scops*—that is to say, it was a large aperture, but showed no sign of an operculum.

<sup>1</sup> Pycraft, "Morphology of the Owls," *Trans. Linn. Soc.*, 1898.



Plate 83

Snowy-owl with hare

By G. E. Lodge















## SNOWY-OWL

The owls so far described are species with which most of us are more or less familiar. The two remaining species to be considered here are comparatively rare. Of these the snowy-owl is one of the most interesting of all the owls, and this on account of its coloration and its mode of life. Of great size, and nearly related to the eagle-owls, it has contrived to find a congenial home in the desolate regions of the north, beyond the limit of forest-growth, as well as in similar climates at high elevations in less northerly latitudes. Only when pressed by the extreme severity of the weather, and the consequent scarcity of food, does it seek more southerly lands. And during such migrations it not unfrequently visits our islands, but only during the winter months: the Orkneys and Shetlands are almost annually visited by these birds, and especially after northerly gales. More rarely it wanders, or is perhaps driven, yet farther south, and Norfolk boasts no less than nine of these visitations.

The habits of this bird, however, must be studied in its northern home, where it may be found breeding chiefly in the region of the Arctic Circle—the fjelds of Lapland, the tundras of Siberia, and the northernmost regions of North America. For some eight months in the year these regions are under some six feet of snow. The three months of hot summer weather are largely occupied in the cares of a family. The nest, which is formed of moss, feathers, and lichen, placed in a hole in the ground, after the fashion of the shorteared-owl, is placed, as a rule, in a steep bank, in a crevice in a cliff, or an eminence rising above the plain, whereby damp is avoided. Incubation, as is usual among owls, commences as soon as the first egg is laid, and the male is said to mount guard during the hours of brooding, and to him falls the task of procuring food for the young, which is apportioned by the female. The young birds, it is to be remarked, are clothed in a sooty grey down, and not, as one would have expected, in white down.



While in the case of some birds, as with seed-eaters, the young are fed on a special diet, with the Owls and other predaceous birds the young fare as their parents. In the case of the snowy-owl the food is commonly furnished by lemmings, but willow-grouse, ptarmigan, and the Arctic hare are also killed, from which fact the snowy-owl, in Sweden, is known as the "Harfang" or hare-catcher. In parts of its range, at any rate, the bulk of its food is furnished by mice and field-voles, varied by musk-rats and squirrels. In Behring Island, for example, Dr. Leonhard Stejneger<sup>1</sup> obtained eleven specimens, all of which were crammed with "arvicoline mice," and it is interesting to note that, according to this author, prior to 1870 there were no mice in the island, and but few snowy-owls visited it. At about this date the house-mouse (*Mus musculus*) was introduced from ships, and the red-backed-mouse (*Evotomys rutilus*) also, in some mysterious way, gained an entrance. Twelve years later this island swarmed with mice, and there was an abundance of resident owls. But they did not feed exclusively on mice, for he also saw them chase "sea-ducks (especially *Histrionicus histrionicus*) out at the reef very much in the same manner as does the falcon." According to Collet, the duty of providing the food devolves upon the male, the female dividing it among the young as it is brought to her. Hence the males, during this period of the year, are always in poor condition, while the females are generally plump!<sup>2</sup>

Reference has already been made to the liking which this and other owls display for fish, but the snowy-owl seems to be almost as expert a fisherman as the true fish owls. Thus they will take their prey by a sudden down-thrust of the feet as they fly low over the water, or they will alight on a low boulder over the water and grip their victims from this station. Audubon<sup>3</sup> has left on record a somewhat remarkable account of this stationary method of fishing. "One morning," he says, "as I lay hidden in a pile of floated logs at the falls

<sup>1</sup> Bull. U.S. Nat. Mus., 1885, 223.

<sup>2</sup> Seebohm's *History of Birds*, vol. i. p. 182.

<sup>3</sup> *Ornithological Biography*, vol. ii. p. 136.



of the Ohio . . . I had an opportunity of seeing this owl secure fish in the following manner: while watching for their prey on the borders of the pots, they invariably lay flat on the rock, with the body placed lengthwise along the border of the hole, the head also laid down, but turned towards the water. One might have supposed the bird sound asleep, as it would remain in the same position until a good opportunity of securing a fish occurred, which, I believe, was never missed; for as the latter unwittingly rose to the surface near the edge, that instant the owl thrust out the foot next the water, and, with the quickness of lightning, seized it and drew it out. The owl then removed to the distance of a few yards, devoured its prey, and returned to the same hole, or, if it had not perceived any more fish, flew only a few yards over the many pots there, marked a likely one, and alighted at a distance from it. It then squatted, moved slowly towards the edge, and lay as before, watching for an opportunity. Whenever a fish of any size was hooked, as I may say, the owl struck the other foot also into it, and flew off with it to a considerable distance."

While some hold that the heavily barred form of snowy-owl which is sometimes met with represents the immature plumage, others are of opinion that this bird, like the tawny-owl and the Greenland falcon, is dimorphic. That is to say, that the heavily barred forms, though they may reduce this character, to a limited extent, with age, are always conspicuously barred; while individuals conspicuous for their lack of barring have, similarly, always been so distinguished. More remarkable still is an observation by Mr. C. W. Beebe,<sup>1</sup> of the New York Zoological Gardens, who, after pointing out that old male birds are sometimes almost pure white in colour, goes on to remark that a male shot in Alaska had the plumage suffused with a "rich and extremely beautiful shade of clear lemon-yellow, exactly as the rose-blush clothes the entire plumage of some gulls in spring. The morning after the bird was killed the colour was gone, the plumage being dead white."

<sup>1</sup> *The Eleventh Annual Report of the New York Zoological Society.*



Whether heavily or slightly barred, the general effect of this plumage is whiteness: and there can be no doubt but that it confers a distinct advantage on the bird, inasmuch as it enables it to occupy any point of vantage wherefrom to survey the land when on the look-out for prey without being itself detected, since the plumage harmonises for the greater part of the year, at any rate, with the mantle of snow which is spread over the whole country. By the time this disappears the capture of prey becomes an easier matter, being more abundant, and it is probable that even then, from its habit of sitting motionless, it is by no means conspicuous. But we naturally ask, Is this whiteness due to the direct action of natural selection, eliminating all but the whitest owls, or is it due rather to the effect of cold, which is inimical to the secretion of pigment? In other words, Is the coloration due to the selection of variations in the direction of whiteness, or is it a physiological reaction to physical stimuli? In either case, it may be argued, natural selection is the arbiter, on the one hand eliminating unfavourable pigmental variations, on the other, variations in which the metabolism is unaffected by cold, for it seems certain that whiteness is essential to survival in these regions for this species, and this whiteness is a highly specialised character induced by selection. The same factors, whatever they may be, have brought about the whiteness of the ptarmigan and the Arctic hare, on which the snowy-owl largely feeds. But this is what we should expect. It is the unwary which are taken, from among the victims; it is the restless owl which goes hungry from among the slayers. Movement, on either side, betrays. Strong contrast with environment, on either side, means death, either by violence or starvation, as the case may be. If only the ptarmigan, grouse, and hare are protectively coloured, then the fox and the owl must perish, for they will give warning of their approach long before they come within striking distance. If, on the other hand, only the fox and owl wear this garment of invisibility, then sooner or later the ptarmigan and hare will vanish.

There is one other point demanding notice, and this concerns the



Plate 84

Shorteared-owl sunning itself (left figure)

By Winifred Austen

Little-owl at the entrance to its hole  
(right figure)

By G. E. Lodge











1000



feet of the snowy-owl. In all the owls there are always more or less feathers down to the claws, though in some this feathering is reduced almost to the condition of bristles. In others, like the long and shorteared-owls and the eagle-owls, for example, the feathering is thick and long, entirely concealing the skin. The snowy-owl has carried this feathering a step further, since the soles also are covered. This appears to be due to the needs of the environment, since the Polar bear and the ptarmigan, which also inhabit Arctic regions or high elevations of perpetual snow, show a similar modification.

As touching the cries of the snowy-owl, but little is to be said, though it is interesting to note that, though a near relation of the eagle-owl, it does not appear to utter that strange, thick, almost husky "o-ooo" which is so characteristic of the eagle-owl. It is said, when on the wing, to utter a loud "*krau-au*," repeated three or four times, and only when excited; while at times, and similarly when excited, it gives vent to a loud cry which has been said to resemble "*rick, rick, rick*," while other observers have attributed to it a low, whining wail.

## LITTLE-OWL

Of the little-owl it is possible many new observations will be made in this country, for while voluntarily it but rarely visits us, numbers have been turned loose during recent years, notably by the late Lord Lilford in Northamptonshire, the Hon. Walter Rothschild at Tring, Hertfordshire, and in Cambridgeshire, and by Mr. E. G. B. Meade-Waldo near Edenbridge in Kent.<sup>1</sup> These have not only thriven in these respective centres, but they have also spread over a large area. But this attempt at introducing the little-owl among us is by no means new, for Waterton, so long ago as 1843, had made the same experiment in Yorkshire, though these birds would seem to have disappeared.

<sup>1</sup> An admirable summary, much too long to give here, of these introductions and the spread of this bird appeared in *British Birds*, vol. i., 1907, p. 335.



The success of later experiments has not met with universal approval. In Cambridgeshire it is said to have materially reduced the numbers of many of the smaller *Passeres*, while still more serious charges are laid at its door by the gamekeeper, who protests that it is a serious pest in the neighbourhood of pheasant coops and of partridge chicks. Since it hunts in broad daylight there may be truth in these charges, though we venture to doubt whether it is guilty of raids on partridges' eggs, which charge has been on many occasions brought against it.

This is the owl that was held in such esteem by the ancient Greeks, who dedicated it to Pallas Athene and engraved it on their coins. By them it was regarded as the symbol of wisdom. The reason for such singular marks of regard is somewhat difficult to understand, for the little-owl is the buffoon among birds, performing the strangest antics when excited, and giving no particular signs of intelligence in its graver and calmer moments. Nevertheless it is said to make an interesting pet. The late Dr. Bowdler Sharpe once kept a pair of these birds, largely for the purpose of exterminating the cockroaches which infested his kitchen. "Every night," he wrote, "the gas was turned low and the owls sat on our hands like trained hawks. Their bright little eyes were turned in every direction, and the advent of a beetle was announced by a vigorous 'bobbing' of their heads. Before I could see the noxious insect, the owls would leave their perch on my hand, and glide noiselessly down and capture the unsuspecting horror. Then they would stand over it, with one wing spread out, as if to protect the savoury morsel from the vulgar world which knows not the delicacy of a black-beetle. Then, grasping it with their toes, holding it like a parrot, as if with a hand, they would munch it up contentedly, till not even an antenna was left to mark the place of slaughter."

Its flight resembles that of a bat, being erratic and speedily changing in direction. Downy pheasants apart, this bird feeds on small birds, mice, grasshoppers, cockchafers, and other insects, while



it breeds in hollow trees, displaying great affection for its young. Mr. R. B. Lodge<sup>1</sup> relates that when in Spain, where it is very common, he took newly hatched young and an adult from a woodpecker's hole. On replacing the young and releasing the old bird, to his surprise she instantly scrambled back again after her chicks.

From its small size and peculiar flight, which does not suggest that of an owl, this bird is likely to escape notice even when it may be tolerably abundant, but its cry is unmistakable. Saunders syllables it as "cu," or sometimes "cu-cu," which it utters "with exasperating monotony," both in spring and autumn.

<sup>1</sup> *Pictures of Bird Life*, p. 303.



# THE ROLLER

[ORDER: *Coraciiformes*. FAMILY: *Coraciidæ*]

## PRELIMINARY CLASSIFIED NOTES

[F. C. R. JOURDAIN. W. P. PYCRAFT. A. L. THOMSON]

**ROLLER** [*Córacias gárrulus* Linnæus. French, *rollier*; German, *Mandelkrähe*, *Blauracke*; Italian, *ghiandaia marina*].

**1. Description.**—This bird is easily identified, the back being of a chestnut-brown colour, the rest of the plumage blue. The feet are syndactyle. The sexes are alike. (Pl. 85.) Length, 12 in. [304·79 mm.]. In the male the scapulars and inter-scapulars and inner secondaries are of a tawny chestnut; the head, neck, and under parts are of a pale cobalt blue; the lower back and rump purplish blue; the greater wing-coverts are greenish blue, the marginal coverts purplish blue. The primaries have the outer webs greenish blue, those of the secondaries purple. The central tail-feathers are of an oil-green colour, the rest greenish blue on the outer, black on the inner web. The lores are black, the forepart of the cheeks and throat dull white, and there is an indistinct superciliary band of dull white. The feet are dark yellow, and the iris is dark brown. The juvenile plumage resembles that of the adult but is duller, the head and neck being of an oily green colour. [W. P. P.]

**2. Distribution.**—The roller has never been known to breed in the British Isles, but is a tolerably frequent visitor on migration, chiefly in the autumn. On the Continent its breeding range extends to about lat. 61° N. in Sweden, while in Russia it becomes scarce in the St. Petersburg government, and rare in Finland, although it has occurred in the Olonetz and Perm governments (lat. 59°). Farther south it becomes more numerous, but is scarce in Denmark, France (except in the south), and the Low Countries, though plentiful in the Mediterranean countries, especially in the Iberian Peninsula. In the Mediterranean it is common in Sicily



and Cyprus, and visits the S. of Sardinia, but is absent from Corsica. Eastward it is plentiful in the Balkan Peninsula and S. Russia, and also occurs during summer in Asia Minor, Palestine, and Persia. The paler Transcaspian birds have been described as a local race. In Western Siberia and Turkestan it ranges occasionally as far as Omsk ( $55^{\circ}$  N. lat.), and also through Afghanistan to Kashmir and North-west India. In Africa it is also a summer resident in the north-west, but only occurs on passage in Egypt. To its breeding-grounds in the northern hemisphere it is only a summer visitor, and its winter quarters are in tropical and southern Africa as well as in India. In South Africa it is not common south of the Orange River, but has been recorded from Natal, Orange River Colony, Transvaal, Damara-land, and about five times in Cape Colony. [F. C. R. J.]

**3. Migration.**—A bird of passage in exceedingly small numbers. The majority of the records are for the autumnal passage, but a fair proportion are referable to the spring journey. The parts of our area most frequently visited are the southern and eastern districts of England and Scotland, especially of the former. But most other parts of Great Britain and many districts of Ireland are occasionally visited; there is even a single record from St. Kilda. (Cf. Saunders, *Ill. Man. B. B.*, 2nd ed., 1899, p. 281; and Witherby and Ticehurst, *British Birds*, i. pp. 281-82.) It has been recorded thrice from Heligoland. (Cf. Saunders, *loc. cit.*; and Gätke, *Vogelwarte Helgoland*, Eng. trans., 1895, p. 422.) These facts seem to indicate Sweden as the summer home of the rollers which migrate through the British area. [A. L. T.]

**4. Nest and Eggs.**—Does not breed in the British Isles.

**5. Food.**—Principally insects, although fruit is undoubtedly eaten to some extent in autumn. As most of its prey is captured on the ground, the insects taken are chiefly Coleoptera (beetles) and Orthoptera (grasshoppers, earwigs, mole crickets, etc.). For fuller details see Eckstein and Rörig's results: those of the former are quoted at length in Naumann's *Naturgeschichte der Vögel Mitteleuropas*, iv. pp. 367-68. Small frogs, lizards, scorpions, centipedes, and locusts are stated to form part of its diet abroad. Cf. also p. 23. [F. C. R. J.]



## THE ROLLER

[F. C. R. JOURDAIN]

Although only an occasional visitor in small numbers to the British Isles, the history of the roller as a British bird can be traced back for over two hundred and fifty years. For the earliest notice of its appearance we are indebted to Sir Thomas Browne, who recorded a specimen killed near Crostwick in Norfolk on May 14, 1644, and sent by him to Merrett. Since that date some twenty-three specimens have been recorded from Norfolk alone, and Professor Newton, writing prior to 1882, estimated that about a hundred occurrences during the nineteenth century were then known. Probably at least twenty more have been recorded since that time, so that we may roughly estimate the average number of occurrences as one annually. A study of the localities from which these records have been derived shows that fair numbers have reached us in all the south coast counties, but that the greater part arrive along our eastern coast-line, especially in East Anglia, although some are known to have occurred as far north as Caithness, Sutherland, the Orkneys and Shetlands, and one has even been recorded from St. Kilda. In our inland and western counties the records are not numerous, for, as a rule, the roller is far too conspicuous a bird to be allowed to live long with us. To Ireland, according to Mr. R. J. Ussher's latest list, it is a very rare straggler, which has occurred in all the four provinces, and ten specimens have been obtained in all. The great majority of our British records have been made during the period of the autumnal migration, but there are a few instances in which it has been shot during the summer months, and in some cases a pair have arrived at the same time. There is, however, no reason whatever to suppose that it has ever bred here, although its breeding range on the Continent extends farther north than the latitude of the Shetlands.



Some modern writers, and especially Mr. A. H. Thayer, maintain that even the most conspicuously coloured animals are really "obliteratively" coloured. Of course there are some striking examples in Nature, where an animal which seems, apart from its natural surroundings, to be marked in such a way as to catch the eye at once, becomes at once invisible in its natural environment. The well-known and somewhat hackneyed example of the black striping on the tiger's tawny hide will serve to illustrate this. But though it is easy to go through the birds on the shelves of a museum, and elaborate a theory by which, under certain given circumstances, even the most brilliantly plumaged birds might be expected to become inconspicuous, we find that in Nature this is not invariably the case. Let us take two examples, the roller and the bee-eater. Both these birds, when closely examined, are marvels of colouring—the bee-eater with its hues of burnished copper, and the roller with its wonderful contrasts of cinnamon-brown, green, light azure, and deep indigo. But when we reach the land of sunshine, and stand on the shores of the Mediterranean and watch in the distance a flock of bee-eaters sailing easily through the still air with liquid note, there is no blaze of colour. Except for an occasional gleam, they might be almost as soberly clad as our own song-thrushes. Of course, if you can get close to a pair sitting side by side upon a telegraph wire till you are only ten or fifteen yards away, then the wonderful yellows and bronze of the plumage can be distinguished, but once they are on the wing they rapidly become inconspicuous again. But with the roller, exactly the reverse is the case. Far off a glimpse is caught of a heavy headed corvine-looking bird, whose light colouring stands out in contrast to the foliage of the ilex trees, and presently with harsh note a bird about the size of a jay launches itself into the air, and with rapid flaps of its azure wings makes for another dead branch on a tree a hundred yards away. Anything more striking can hardly be imagined: the bird forces itself on the attention of the most indifferent. Our little kingfisher is perhaps as brilliant,



and very similar in scheme of colour, but he is a mere speck in the landscape—a microscopic point of colour, while a pair of rollers, or still better a flock of these marvellous birds, haunting the mud cliffs and dry water-courses of the lower Danube valley, is a sight never to be forgotten.

Throughout the whole of Europe and North Africa the roller is only known as a summer resident or bird of passage. His winter haunts lie in the recesses of Central and Southern Africa, but some of the birds which breed by the water-courses of Kashmir apparently winter in the lower Indus valley. Only a small proportion extend their wanderings beyond the Orange River, although a few specimens have been recorded from Natal in January and February; from King William's Town, East London and Port St. John in Eastern Cape Colony, occasionally in the Orange River Colony, Transvaal, Bechuanaland, Namaqualand, Damaraland (in January), and Rhodesia. Farther north it becomes more plentiful, and occurs in some numbers in Gazaland, while Mr. G. A. K. Marshall describes it as fairly common round Salisbury in Mashonaland, arriving from the north about September and leaving early in April. His supposition that it probably breeds here (*Ibis*, 1900, p. 246) is, however, very unlikely. According to Hartlaub it also reaches Madagascar, while de Bocage records it from Angola, and it is also found in German and British East Africa. Professor Reichenow has suggested that these African specimens may belong to a distinct race, as they possess a greener tinge on the head and throat. This is, however, probably only seasonal, and Dr. R. B. Sharpe pointed out that a specimen from Mesopotamia, killed on August 26, was moulting from a blue head into an olive-green one, similar to that of the African birds.<sup>1</sup> It is a regular migrant in Kamerun, passing in October and November, and probably also on the return passage; while Dr. Rendall records it from the Gambia, Weiss from the Island of São Thome, and Keulemans from Principe. During its stay in its winter quarters the roller is addicted to perching on the top boughs

<sup>1</sup> *Ibis*, 1902, 613.



Plate 85

Rollers, adult (foreground), young (background)

By Winifred Austen















of isolated trees in fairly open country, or resting on the telegraph wires. It is not particularly shy, and can be approached within gunshot without difficulty. In the Gambia Rendall noticed that it would dash down from the top branches of a tree after a lizard which had rashly ventured into the open, but farther south it is generally described as feeding on beetles, locusts, and grasshoppers picked up on the ground. Von Heuglin on one occasion came across many hundreds in October feeding on the swarms of locusts. Being to a great extent independent of water, and able to pick up a living in all but the most arid deserts, as well as having considerable power of flight, the roller is probably able to cross the Sahara without the necessity of diverging in order to follow up the Nile valley or to keep near the coast. Soon after the beginning of April the first arrivals may be noticed in Tunisia, and about the same time, or a little earlier, in Morocco and Algeria, and here some settle down at once to breed, while their companions pass over across the Straits of Gibraltar as well as to Sicily and Italy. In Morocco it is a somewhat local bird, breeding among the ruins at Larache and other places in considerable numbers. Mr. Meade-Waldo describes how he encamped among some ruins where a colony of quite three hundred of these magnificent birds were breeding. At the time of his visit they were feeding their young with large and very poisonous centipedes, quite six inches long—not a particularly inviting diet, to our ideas at any rate. The same writer also found it an abundant species in the Great Atlas, and notes that it was breeding in the old walnut trees at an elevation of 6000 feet. In Algeria and Tunisia it is also frequently found nesting in trees in wooded districts, but the more usual breeding-place is in a hole in the steep bank of some river or a crevice in a cliff face. Towards the end of April the migration in Tunisia is at its height, and Mr. J. Whitaker<sup>1</sup> describes how the telegraph wires lining the routes were constantly occupied by small flocks of these birds, which kept on taking short flights and perching again on the wires ahead. Curiously enough, in North-east

<sup>1</sup> *Birds of Tunisia*, ii. 52.



Africa it is quite unknown as a breeding species, though large numbers pass through on passage to Palestine and Asia Minor. No doubt many birds also diverge eastward on their way through Arabia to the highlands of Persia, Afghanistan, and Transcaspia.

There is some difference of opinion as to the way in which the roller migrates. It evidently moves by day, and some observers speak of large flocks consisting of some hundreds, while others describe it as passing in small flocks or pairs. Probably these apparent discrepancies are due to local conditions. Thus in Egypt it is generally noticed either singly or in small parties according to von Heuglin and Shelley, but in Palestine it arrives in large flocks, which very gradually disperse themselves over the country. Tristram gives a graphic description of the behaviour of these newly arrived migrants. "For several successive evenings great flocks of rollers mustered shortly before sunset on some *dom* trees near the fountain, with all the noise, but without the decorum, of rooks. After a volley of discordant screams . . . a few birds would start from their perch, and commence a series of somersaults overhead, somewhat after the fashion of tumbler pigeons. In a moment or two they would be followed by the whole flock, and these gambols would be repeated for a dozen times or more. In about a week the immigrants dispersed . . . after this dispersal not a roller ever came back to the *dom* trees where they had roosted at first." It is interesting to see how they adapt themselves to their surroundings. The telegraph wire is at once used as a substitute for the dead branch: in the valley of the Nile the stumps of the durra, which are left standing in the fields to the height of some feet, are freely used as perching-places, while Captain Sperling saw them seated on the slender reeds in the swamps on the treeless plain of Sharon, and Tristram watched them perched on knobs of gravel or marl in the barren Ghor by the Dead Sea, waiting for the emergence of beetles from the sand.

The distribution of this species during the breeding season in Europe and Asia has already been indicated in the "Classified Notes,"



so that it is unnecessary to recapitulate it here. But it must be remembered that in most parts of Europe it is by no means a common bird. It is, however, plentiful in some parts of the Iberian Peninsula, such as the Guadalquivir valley above Seville, and is fairly common in Sicily, and extremely numerous in the lower Danube valley, except where it has been exterminated by plume-hunters, parts of South Russia and Asia Minor. Naumann remarks that it is found only in flat or slightly hilly districts, where the soil is sandy, and that it haunts open woodlands, interspersed with old oaks, or the neighbourhood of pine forests. We have, however, already seen that though this is true for Germany it does not hold good for the southern portion of its range, where it is a common breeding species, to a considerable height in the Great Atlas. In the same way, where the bird is scarce and liable to persecution, it is decidedly shy and wary, but where plentiful, as locally in North Africa and the Balkan Peninsula, it is quite the reverse. In the Dobrogea I have driven within two yards of a bird seated on a bush by a roadside without causing it to take wing.

Most of the birds which arrive in Northern Europe appear to be already paired, and proceed at once to the business of breeding; but the appearance of an unmated male on the scene is the signal for an energetic attack, accompanied with loud and harsh cries, and he is soon chased away from the neighbourhood. Where the birds are plentiful, and many pairs are found breeding in company, a good deal of bickering and fighting undoubtedly takes place. Naumann goes still further, and states that much quarrelling, accompanied by noise and continual pecking, takes place between the sexes till the eggs are laid, but this is not confirmed by von Löwis and other observers. During the fights between rival males, whole bunches of feathers are torn out, especially from the head, and severe bites are given. In some cases a pair of fighting birds have been picked up by hand, neither being willing to let go his hold, and Naumann states that such birds are occasionally captured by prowling foxes. But the most remarkable feature about the behaviour of the male at this season is



the extraordinary flight, from which he derives his name of "roller." In fine weather he rises in the air with loud and harsh "*rack, rackkack,*" etc., to a fair height, and proceeds to "tumble" or turn somersaults in his flight, after which he darts down with a harsh chatter which Naumann writes as "*raeh, raeraeh, rraeh, rrae,*" etc., returning at length to his perch.<sup>1</sup> The ordinary flight of the roller is rapid and powerful, and has been compared by some writers to that of the pigeon: the firm, decided flaps are often varied by an occasional tumble and glide, but now and then a bird may be seen at a good height, winging its way steadily to some distant point, and calling harshly at frequent intervals. He does not hop from one bough to another, but flies, while on the ground he never seems quite at home when in motion, but hops somewhat slowly, although wonderfully quick at seizing his prey.

The nesting-place varies according to locality: in well-wooded districts, such as Northern Europe, it is generally in a hole of some old tree, rarely less than six feet or so from the ground, but many pairs breed in holes of old and ruinous buildings in North Africa and Eastern Europe: holes in mud cliffs and banks of streams are used by thousands of birds in the Balkan Peninsula and other southern districts, and in Spain I have seen nests in quarries and among rocks. Krüper found that in Asia Minor some pairs bred in old magpies' nests in which the roof was still standing, while the late Herr Hocke maintained that he had taken the eggs from a wood-pigeon's nest in Germany.<sup>2</sup> In Bulgaria, Herr O. Reiser discovered a colony of about seventy pairs breeding in company with red-footed falcons, in an old piece of oak forest. In such situations there is naturally no difficulty in finding nests, but where isolated pairs are nesting, considerable caution is shown by both sexes, though, of course, the presence of the male—his restless movements and tumbling flight—

<sup>1</sup> Naumann describes the call-note as a high, ringing "*kraeh,*" not unlike the cry of the young jackdaw, and when rapidly repeated the "*rack-rack*" sounds more like "*ckrakra-kra-kra*" according to von Löwis (*Naturgeschichte d. Vögel Mitteleuropas*, iv. 300).

<sup>2</sup> The nesting-boxes now used in some of the German forests are also occupied at times, as are also old holes of the great black-woodpecker, where the entrance has been enlarged.



betrays the presence of a nest not far away. Even where several pairs are breeding close at hand, suspicion is at once aroused by the presence of a watcher, and great unwillingness to disclose the nesting-site is always shown, at any rate in the earlier stages of breeding.

Commander Lynes noticed in Sicily that the cock warned the hen when danger was at hand, and she took advantage of the warning to slip away quietly from the hole.

In trees there is often no nest, or a mere handful of grass and a few dead chips, but in some cases a rough bed of roots, grasses, feathers, or hair may be found. The eggs are usually four or five, sometimes only three or even six in number, pure white and smooth, but less glossy than those of the great black-woodpecker, and not so pointed. The average size of 208 Russian eggs is, according to Herr Goebel,  $1.39 \times 1.11$  in. [ $35.4 \times 28.4$  mm.]. Krüper states that in Asia Minor he found a clutch in which the most recently laid egg was normal, but the others were stained by rain acting on the nest material till they resembled ptarmigan eggs! Both sexes are said to take part in incubation,<sup>1</sup> but unfortunately Mr. W. H. St. Quintin, who has bred this species in confinement, does not mention whether this was the case with his birds. The incubation period is apparently eighteen to twenty days,<sup>2</sup> and so closely does the sitting bird incubate that she will often allow herself to be caught on the nest. When the young are hatched, both parents take part in feeding them, but the excreta are never removed, and the young become exceedingly dirty. Naumann graphically states that they sit in dirt and filth to over their ears, and that their smell is most offensive in consequence. Mr. St. Quintin's first young bird left the nest twenty-six days after the cries of the newly-hatched young were first heard. It could perch and fly well from the first, and two days later a second followed. For about a week afterwards they returned to the nest-hole to sleep. In a wild state the young are seen with the parents after they have left the nest, and are fed by them.

<sup>1</sup> Naumann, *Naturgeschichte d. Vögel Mitteleuropas*, iv. 369.

<sup>2</sup> Bau gives the period as seventeen days.



The young, of course, are fed on insect food in the nest; but, as already stated, Meade-Waldo has seen the old birds carrying centipedes to the nests in Marocco. In Europe the principal food of this species consists of beetles (more especially of the genera *Geotrupes*, *Carabus*, *Melolontha*, *Elatér*, *Harpalus*, etc.), Orthoptera (especially *Gryllotalpa* and *Gryllus*). Most of these are taken on the ground, but occasionally the roller has been seen to take insects on the wing. In Africa it has also been recorded as feeding on lizards (Rendall), locusts, scorpions, centipedes (Meade-Waldo), etc., while there is little doubt that small frogs are also devoured. There is strong circumstantial evidence that a hungry migrant, in default of other food, will kill and eat small birds (cf. O. Reiser, *Ornis Balcanica*, iii. 296). It is said by many writers to be purely insectivorous, but there is little doubt that it also eats fruit or vegetable matter in a wild state, in order to obtain the requisite moisture, for the roller is apparently, like the hoopoe, naturally a non-drinking bird. Lord Lilford found remains of figs in the stomach of one examined, and Herr Reiser states that figs are extensively eaten in autumn in Greece. One of Mr. R. Phillipps' birds ate grapes with avidity, and von Löwis has observed it eating raspberries in a wild state in Livonia. In the autumn both old and young birds are fat and in good condition for the long journey in front of them. Late in July some have already begun to move southward, and by the end of that month the first arrivals are beginning to appear in Egypt, sometimes moving in small flocks or family parties. In Germany the exodus begins early in August and lasts to mid September, and approximately the same dates hold good for Greece and Marocco. The autumnal movements are carried out with more deliberation than in the spring, but by the beginning of November they have all disappeared from Northern Africa, and by different routes are working their way to the still little known recesses of tropical Africa.



# THE HOOPOE

[ORDER: *Coraciiformes*. FAMILY: *Upúpidæ*]

## PRELIMINARY CLASSIFIED NOTES

[F. C. R. JOURDAIN. W. P. PYCRAFT. A. L. THOMSON]

**HOOPOE** [*Upúpa épops* Linnæus. French, *huppe*; German, *Wiedehopf*; Italian, *bubbola*].

1. **Description.**—The long crest, curved beak, and the richly contrasted masses of cinnamon, black, and white serve to distinguish the hoopoe from all other British birds. The sexes are alike in coloration, and the young differ but little from the adults. There is no seasonal change of plumage. (Pl. 86.) Length, 12 in. [304·79 mm.]. The crest, formed of a double row of feathers running down on either side of the middle line of the crown, is of a rich cinnamon-buff, tipped with black, the hindmost feathers being, commonly, a bar of white below the black. The hind-neck, throat, fore-neck, and breast are of a pale vandyke-brown strongly overlaid with buff. Interscapulars and scapulars pale vandyke-brown, the hind region with a broad semicircular band of buff bounded on either side by an equally broad band of black. Rump white. Lesser wing-coverts pale brown. Minor coverts black, the hindmost broadly tipped with buff; the median coverts have the basal half buff, the rest black, while the major coverts are buff with broad black tips. The primaries and secondaries are black, crossed, in the outstretched wing, with a treble band of white, but in the secondaries the white gradually changes to buff as the inner series are approached; the two innermost feathers have each a broad band of buff along the margin of the outer web and a streak of buff along the inner side of the shaft. The tail is black, crossed, near its middle, by a broad white chevron, the limbs of which are directed backwards. The flanks are white, more or less conspicuous with dusky streaks, while the abdomen and under tail-coverts are white. The female differs from the male only in being somewhat smaller, rather duller, and in having a smaller crest. The juvenile plumage resembles that of the female. Young birds can be most readily distinguished by their shorter beaks. [W. P. P.]

2. **Distribution.**—The breeding range of this species extends over the



greater part of the European continent, but in southern Norway it is a very scarce visitor on migration, although it breeds in small numbers in the southern part of Sweden up to about 60° N. It has now ceased to breed in Denmark, while in Russia it nests rarely in the Petersburg and possibly in the Jaroslav governments and in some numbers in the Simbirsk government. South of these limits it is generally distributed, becoming very common in the Iberian Peninsula and S. Russia, and also breeds in the Mediterranean islands, although apparently not in Greece. It also nests in the Canaries and North-west Africa. A local race is found in Egypt, but from Palestine and Asia Minor it is found in the breeding season across the temperate parts of Asia, south to Northern India, but is replaced by other local forms in the Indian Peninsula and South-east Asia as well as in Central and Southern Africa. It has been recorded as breeding in the countries bordering the English Channel at rare intervals, and would probably do so frequently if it were not for the senseless persecution to which it is subjected. The winter quarters of the European breeding birds lie in Northern and Middle Africa, some remaining as far north as the oases of the Sahara, while others wander to Senegambia and the Hinterland of the Guinea Coast on the west side and Abyssinia on the east, or roughly to about lat. 10° N. Many Asiatic birds winter in India, and probably also in Arabia. [F. C. R. J.]

**3. Migration.**—A summer visitor and a bird of passage. In April and May the birds arrive on the south coast of England, chiefly on the shores of Kent and Sussex. A proportion of these birds may fairly be described as summer visitors, in that they nest in the south of England if they are allowed to do so. But others continue their migration through the eastern districts of Great Britain and beyond our area. The autumn passage through the eastern and southern parts of Great Britain is less noticeable; exceptionally the hoopoe is recorded in the winter months (cf. Saunders, *Ill. Man. B. B.*, 2nd ed., 1899, p. 285: and Witherby and Ticehurst, *British Birds*, i. pp. 282-83; iv. p. 338). As a bird of passage the hoopoe also occurs in Ireland, generally about the coasts or light-stations, especially those in the southern part of the country. Its arrival in Ireland is very early: many records relate to February, and March is the month in the year with the greatest number of occurrences; the number diminishes in April and May, and in September and October the autumn passage takes place; exceptionally the hoopoe has been recorded in Ireland in every other month except August (cf. Ussher and Warren, *B. of Ireland*, 1900, pp. 111-12). Southern Sweden probably forms the summer quarters of the birds which pass through our area: on Heligoland the



species occurs in small numbers between the middle of April and the middle of May (cf. the preceding paragraph; and Gätke, *Vogelwarte Helgoland*, Eng. trans., 1895, p. 437). Single examples are all that our area generally affords, but "small flights" of hoopoes have occasionally been recorded (cf. Nelson, *B. of Yorks.*, 1907, p. 286). [A. L. T.]

**4. Nest and Eggs.**—The usual site is in a rather narrow crack or hole in a tree, sometimes close to the ground and at other times as much as twenty feet or more above it. Willows and olives are frequently made use of, but where old trees are scarce the hoopoe will breed in holes in stone or mud walls, in drains or crevices in rocks. Other abnormal sites are mentioned on p. 440. In most cases there is no nesting material, while in some, bits of straw, stalks, roots, or feathers are carelessly arranged, but excrement, human, bovine, and equine, is often found in the nest-hole, which is also much befouled by the droppings of the young. The eggs are usually 5 to 10 in number, while 12 are said to have been found in one nest. They are rather elongated in shape as a rule, and pale greenish blue, or brownish yellow in colour when fresh, in some cases dotted with small punctures showing the light-coloured shell beneath. Owing to the foul condition of the nest they readily become stained. Average size of 100 eggs,  $1.01 \times .70$  in. [ $25.9 \times 17.9$  mm.]. Incubation is carried on by the hen alone, and begins before the clutch is completed. According to Naumann it lasts for 16 days. The average breeding time in the Mediterranean region is from the last days of April to the second week of May: in Middle Europe about a week or ten days later. Nests reported from Sweden in July are probably second layings. Only one brood is reared in the season. [F. C. R. J.]

**5. Food.**—In hot climates most of the food of this bird consists of Coleoptera and their larvæ, which it extracts from dung by means of its long pointed bill, making innumerable small holes for this purpose. Large numbers of Orthoptera and their larvæ are also devoured, as well as centipedes and ants. In temperate climates grubs and worms are extracted from turf in the same way by boring with the bill, and a manure-heap is a great attraction. Ants, the larvæ of certain Diptera (*Tipula*, etc.) and Lepidoptera (*Noctuæ*, etc.), as well as woodlice, also form part of its diet, and on migration it was observed by Sperling and Krüper to take flies on the wing. For details see Eckstein, *Aus dem Walde*, xvii. No. 46, p. 361; Naumann, *Naturgeschichte der Vögel Mitteleuropas*, iv. p. 384, etc. [F. C. R. J.]

**6. Song Period.**—The call is heard immediately on its arrival in its breeding-haunts, and is continued in all probability till the young are hatched, but I can find no definite information as to when it ceases. [F. C. R. J.]



## THE HOOPOE

[F. C. R. JOURDAIN]

As a summer visitor to our shores the records of the appearance of this bird are of quite respectable antiquity, ranging back for over two hundred and forty years. The earliest writer to record its appearance was Merrett, who, in his *Pinax rerum naturalium Britannicarum* (p. 173), mentioned that it had occurred in the New Forest and also in Essex. From this time onward, as the number of observers has increased, the notices of its occurrence have become more numerous, and now it is known to be a fairly regular spring migrant, arriving on our southern and south-eastern coasts in small numbers annually. Unluckily, its conspicuous crest and the bold barring of the wings are apt to attract the attention of the man with a gun, and in spite of well-meant protection orders, only a very small proportion of our visitors are allowed to settle down and rear their young in peace.

There is, however, good evidence that it has bred in all the counties bordering on the English Channel, as well as in East Anglia. In Cornwall a brood of four was successfully reared out of a clutch of five eggs near St. Columb in 1901;<sup>1</sup> in Devon, a nest with four young was taken in a wood in the parish of Tavistock some time prior to 1836;<sup>2</sup> it is said to have nested in pollarded willows by the river Lenthay, on three or four occasions, in Dorset;<sup>3</sup> Borrer mentions two instances of its breeding in Sussex, at Southwich near Shoreham, and at Chichester, about 1835;<sup>4</sup> and I have reason to believe that it has also nested at least twice quite recently in the same county; in Hampshire, eggs were taken by Mr. Hart in 1886, while Dr. Günther states that young were reared in the New Forest in 1897 and 1898, and the Rev. G. M. Hewett records nests in 1900 and 1902; in Ken

<sup>1</sup> J. Clark, *Zoologist*, 1907, p. 284.

<sup>2</sup> *Our Summer Migrants*, p. 251.

<sup>3</sup> *Birds of Devon*, p. 119.

<sup>4</sup> *Birds of Sussex*, p. 168.



however, though there is strong presumption that the bird has bred on several occasions, there is no positive record of a nest having been found.<sup>1</sup>

Other counties where nesting appears to have taken place are Surrey (near Dorking in 1841, and also in 1847 at Letherhead);<sup>2</sup> in Wiltshire,<sup>3</sup> Essex, and possibly also in Suffolk.

No doubt if the immigrant birds which arrive in Kent and Sussex in April and May could be efficiently protected, this beautiful and harmless species would not only become a regular breeder along our southern coasts, but would in time also penetrate to the parks and water-meadows of the midlands. Dr. Ticehurst<sup>4</sup> says that the favourite landing-place of these birds is the long extent of coast-line between Hythe and the Sussex border; while the low ground in the neighbourhood of Walmer and Deal, and thence eastward to Thanet, is also much favoured by them.

Although the great majority of our records are evidently birds on spring migration, yet a fair proportion also occur during the return movement in autumn, while from time to time stragglers have been recorded during the winter months.<sup>5</sup> Out of sixty dated Kentish records, those in spring outnumber the autumn ones by three to one, according to Dr. N. F. Ticehurst. There is hardly any part of the British Isles, however remote, which has not been occasionally visited by this erratic species, and we find notices of its occurrence in the Outer Hebrides, the Orkneys, Fair Island, and the Shetlands, as well as on the rocky islets off the west coast of Ireland. The migratory movements of the birds which visit us have already been treated of in the "Classified Notes" (pp. 71-72 *antea*), and it is only necessary to add that in Ireland, out of a hundred and seventeen records mentioned by Mr. Ussher, seventy-six, or nearly two-thirds, occurred along the south coast between Wexford and Cape Clear.<sup>6</sup>

Although so widely distributed in Europe during the summer

<sup>1</sup> Ticehurst, *Birds of Kent*, p. 245.

<sup>2</sup> *Birds of Wilts*, p. 267.

<sup>3</sup> *British Birds*, iv. p. 338, etc.

<sup>4</sup> *Birds of Surrey*, p. 104.

<sup>5</sup> Ticehurst, *Birds of Kent*, p. 242.

<sup>6</sup> *Birds of Ireland*, p. 112.



months, the winter quarters of this species lie in Middle Africa and Southern India. The Egyptian and Nubian birds form a local race, but the ordinary form winters, for the most part, in the vast region which extends from Abyssinia and the Galla countries on the east side, to Senegambia, Haussaland, and the Gabun district on the west side. In South Africa it is replaced by another form with entirely black primaries, while the Madagascar and Somaliland races have also been separated. In the Canaries and North Africa some birds appear to remain all the year round. In Asia the ordinary form has a wide range across most of the temperate regions of that continent, but is replaced by local races in Eastern Siberia and Mongolia, India, Ceylon, South China, and Hainan.

The colloquial name 'Gallo di Marzo,' or March-fowl, has been commonly applied to this bird on account of its being one of the early spring migrants to Southern Europe. During this month the greater part of those birds which breed in Western Europe pass across the Straits of Gibraltar, but a few begin to move northward even during January and February. The average date of the first arrivals on the Spanish side is, however, about the middle of February. Farther to the eastward, in Tunisia, Mr. Whitaker notes the arrival of the first comers towards the end of February or beginning of March, from which date the passage continues unabated till the end of April, and has ceased altogether by the middle of May. On migration, small parties up to about a dozen may be seen together, although as a rule the species is generally seen singly or in pairs. In Sardinia, Sicily, and Malta it is a well-known visitor on spring passage, the main body arriving in April, while in Greece Dr. Krüper notes the first arrivals on or about March 24th. During migration time individuals may frequently be met with crossing the Mediterranean, flying rather low, with the action peculiar to this species, which enables one to recognise it at a great distance. Its flight has been compared to that of the jay: it appears to be weak, and there seems to be a perceptible pause between the wing flaps, while the broad wings, with their bold con-



trasts of colour, are unmistakable. In spite of its seeming weakness, the bird travels at a fair pace, with a certain amount of undulation, and when pursued in the air, flits about with light, almost butterfly-like strokes of its wings, and is evidently by no means easy to catch. In Palestine, Tristram was inclined to think that it must migrate by night, as he found it generally distributed, without being able to detect any preliminary migratory movements; but it is clear that on its sea voyages, at any rate, it moves by day. Many birds have already been left on the south side of the Mediterranean to breed in the forests and hills of Northern Africa, and some settle down in most of the larger Mediterranean islands to breed, while others push on across the Continent to their breeding-places. Hardly an olive grove in Southern Europe now but contains a hoopoe or two, and everywhere one hears the soft "*poo-poo-poo*" repeated, now close at hand, now half a mile away. But some birds must still push on, moving quietly onward by short flights into Central Europe, working their way slowly up the river valleys, and haunting willows, water-meadows, and orchards. Stragglers have been known to penetrate within the Arctic Circle and even to Spitsbergen, but the normal breeding range on the Continent does not extend beyond Southern Sweden, and up to about lat. 55° N. in Russia. It is, however, by no means confined altogether to low ground, for Mr. Elwes found it quite common in some of the wildest and most desolate valleys of the Himalayas, at heights of from 12,000 to 15,000 feet, and in Southern Tibet Captain Walton records it as common up to mid-October at 15,200 feet (*Ibis*, 1906, p. 241). In Spain, and in many parts of the Balkan Peninsula, it is a very common bird, as well as in South Russia. But common though it is, and by no means shy, except where it has learned by experience to dread the gun, it shows considerable caution, as a rule, in the choice of its breeding-place. Now and then one finds a nest, perhaps in a hollow of a stone wall, quite close to a house, and as the parents become accustomed to the sight of men, they will fly in and out with food within a yard or two of the spectator.



But the natural inclination of the bird seems now to be towards seclusion and secrecy. From tree to tree he flits, often, too, settling on the ground, and constantly uttering his call. Should a rival male appear before each pair is settled down, a fight is sure to ensue, and it is quite a common sight to see the two cocks sparring with one another like gamecocks, leaping and fluttering in the air over one another, while the hen looks on with a studied air of indifference. Some of these fights are severe, and on one occasion in Spain I came across two males which were so engrossed in their struggle that they allowed me to approach within a few yards, and seemed much exhausted. M. Necker also says that after a fight the ground is at times strewn with their feathers.

Little has been recorded of the courtship of this species. Full use, of course, is made of the crest, and no doubt the boldly barred wings are also displayed, but as a rule one only gets a glimpse of the bird calling among the branches of the trees, or quietly and sedately walking about with his mate on the ground. Both sexes take part in the work of house-hunting. One sees male and female disappearing in turn in the recesses of a dry stone wall, or in a wood unexpectedly flushes one bird from a hollow in a tree, where he or she has been prospecting for a likely site; but, somehow, they seem to feel instinctively that they are being watched, and operations are at once suspended *sine die*. The nest is generally in a cranny or hole of a tree, or else in a wall or rock crevice. The hoopoe has, however, been known to breed in a rabbit-hole, and has recently been known to take to a nesting-box. Heaps of stones also furnish possible sites, while drains have been utilised, and the nest has been found underneath a big boulder on a hillside. Pallas found a pair breeding in the decayed chest of a rotting corpse, loosely covered with stones, and notes that an open coffin in China forms a favourite nesting-place, and in Eastern Europe many nests are built in holes of mud walls. Some nests are quite low down, others nearly twenty feet from the ground. The entrance to the hole is preferably rather narrow, and



Plate 86

Hoopoes at their nest-hole

By Winifred Austen















the hole itself often descends for a foot or two. In some cases no nesting material is placed in the hole at first, while in others a few bents and bits of rubbish are collected together; but the most curious circumstance connected with the nest is that it generally contains ordure of some kind, often of the most offensive character, especially in the later stages of breeding. There seems to be no doubt that this is deliberately collected by the bird itself, and it is a remarkable coincidence that the nests of three such brilliantly plumaged birds as the kingfisher, roller, and hoopoe should all be kept in apparently such an insanitary state, and be so disgusting, at any rate, to our senses.

Here the hoopoe deposits her eggs. Most writers on ornithology underestimate the number of eggs laid, but five is probably the minimum for a full clutch; and some nests contain as many as nine, ten, and even twelve, according to Radde. The common explanation given of these large clutches, that two hens lay in one nest, seems to be improbable in this case, owing to its restricted dimensions and generally narrow entrance, while the hen begins to incubate before the clutch is completed, as is proved by the fact that the eggs are found in different stages of development, and, as soon as incubation begins, the hen spends practically all her time in the nest. In fact, it is only after the closest observation that the hen can be detected leaving the nest at all. The cock brings food to her on the nest throughout the period of incubation, putting his head inside the hole with insect food of some sort in his bill. Dr. D. Scott, who had two pairs breeding in the verandah of his house at Umballa, by close watching ascertained that the hens left the nest once or twice during the day, but only to take a short flight, during which they passed their droppings, and returned to the nest without alighting on the ground at all.

The information given in most works on the time of year at which the hoopoe breeds is usually of the vaguest character. But it has already been shown that there is considerable variation in the time of



arrival of these birds in Southern Europe. In Southern Spain, Chapman gives May 1st as the average nesting time, and this accords fairly well with my own observations, though full clutches may be found in the last week of April. On April 28, 1907, however, I came across a hoopoe's nest in a willow in Central Spain, not far from Madrid, where the birds might well be expected to be later breeders than in the Andalucian plains. On cutting this nest out, to my astonishment I found big young, with well-developed crests and primaries, so that even on this plateau some birds must have eggs at the beginning of April. In Middle Europe the best time for full clutches is about the second or third week in May, and in Asia Minor also about the same time.

While the hen is sitting the cock keeps watch in the neighbourhood, and warns her of the approach of danger by a harsh chattering note. This sound is also heard when two birds are quarrelling. Another curious note which is not unfrequently uttered is a curious cat-like "*quuaaw*" or "*kiaouww*." I have never been able to get a good view of the bird when making this noise, but while the familiar "*poo-poo-poo*" is being uttered the bird bows its head (with depressed crest) to the branch on which it sits, and even at a distance one can see that the neck is inflated. The sound also varies, sometimes being quite softly uttered, and at other times more loudly. Swinhoe sent some interesting notes to the *Zoologist* (1858, p. 6229) on the method in which this sound is produced. He states there that the air is drawn into the trachea, which puffs out on each side of the neck, and is then forced out again by striking the point of the bill against the ground, each stroke producing a separate and distinct note. At the end of the three notes which make up its song, the air is exhausted, and before repeating its call the neck is re-inflated with a slight gurgling noise. In some further notes on the same subject in the *Proc. Zool. Society of London*, 1871, p. 348, he points out that the trachea of the hoopoe is not dilatable, but its œsophagus is, and the puffing of the neck is caused by the bulging of the œsophagus with



swallowed air. As there is no connection between the œsophagus and the trachea, and apparently no organ at the entrance to the former which could modify sound, it becomes difficult to see what share the swallowed air has in the production of the notes. Probably, however, the dilated œsophagus serves as a chamber of resonance, as in the case of the air-filled crops of pigeons while cooing. Personally, I have not been able to detect the hammering on the ground of which Swinhoe speaks, perhaps because the birds I have seen calling have been generally perched on branches of trees, and Swinhoe distinctly says that when perched on a rope it only jerks out the call with nods of the head, producing a modified note, which he writes as "*hoh-hoh-hoh*."

Although popularly believed to be an exceedingly timid bird, Mr. P. J. M'Gregor says that he has seen a hoopoe attack a stork which had ventured near its nesting-place. It has a curious habit of suddenly flattening itself out on the ground with outspread wings, and tail and beak pointing upwards. This attitude is assumed when some bird of prey is passing over, and on sandy and rocky ground is extraordinarily protective, the colours harmonising well with its surroundings. On two occasions in Holland Mr. J. G. Keulemans noticed that birds which he had surprised adopted this position and at once became practically invisible.<sup>1</sup> Bechstein compares the general effect to that of an old particoloured rag lying on the ground.

Young hoopoes when first hatched are quaint-looking little creatures, with quite short bills, and naked, although they soon become covered with small blue quills. They make a hissing noise, and Swinhoe notes that they crouch forward and do not stand upright till nearly fledged. Dr. Clark remarks of the young which were reared in Cornwall, that when first hatched the beaks were not at all conspicuous, though their gape was enormous. "The crest quills

<sup>1</sup> See the *Field*, July 5, 1902, where this attitude is illustrated by a sketch by Mr. F. W. Frohawk.



were decidedly in evidence on the fourth day, and on the sixth the quills that covered their pink ungainly bodies clearly showed the russet-brown of the coming plumage, and the well-marked black and white bars of the wings" (*Zoologist*, 1907, p. 284). Both parents are assiduous in feeding the young, but make no attempt to remove their excreta, which accumulate in the nest. Mr. Meade Waldo gives some interesting details of the way in which the young are fed. As a rule the old birds only carry one insect at a time, and quite at the tip of their beaks. A centipede is carefully folded into about four loops. In the Canaries and Marocco, where these observations were made, the young hoopoes were fed largely on centipedes about two and a half inches long, and crickets in the larval stage, as well as the larvæ of certain beetles. When first removed from the nest the smell of the young hoopoe is most offensive, the nest being by this time in a most filthy state; but after being fed for a few days on clean food, and kept in sanitary conditions, the offensive smell passes away, and the bird becomes an attractive pet, but a somewhat difficult one to keep.

The food of the adult consists chiefly of insects. In temperate climates these are dug out of turf or from heaps of dung by means of the long curved bill. Various species of *Scarabæi*, *Bembidia*, and *Aphodii* are extracted in this way. They are then knocked about for a time; the bird's head is then thrown back and the beak widely opened, when the grub disappears into the mouth and is swallowed. Worms are also treated in the same way, after being pulled out of the ground and bruised. A hoopoe has been seen to kill a locust, but it is doubtful whether it could have eaten it, unless possibly piecemeal. In confinement it will eat many kinds of vegetable and fruit readily, and probably derives some of the moisture required in this way, for in a wild state it is apparently a non-drinking species. Indeed, in many districts where hoopoes are common, no surface water is available for drinking purposes for many miles, and if it were necessary to the existence of the species, its journeys to and from its



drinking-places would soon attract attention, as in the case of the sandgrouse.

Towards August the hoopoe begins its southward migration. It appears to move gradually and slowly, feeding as it goes, and sometimes family parties are met with moving together. By the middle of September nearly all our European birds have left us, and, with the exception of a straggler or two here and there, have crossed the Mediterranean on their way to their winter quarters in Africa.



# THE KINGFISHER

[ORDER : *Coraciiformes*. FAMILY : *Alcedinidæ*]

## PRELIMINARY CLASSIFIED NOTES

[F. C. R. JOURDAIN. W. P. PYCRAFT. A. L. THOMSON]

**KINGFISHER** [*Alcédo ispida* Linnæus. French, *martin pêcheur* ; German, *Eisvogel* ; Italian, *martin pescatore*].

1. **Description.**—The kingfisher is distinguished at once by the blue of the upper and the chestnut-red of the under parts, the long beak, and red, syndactyle feet. The sexes are alike. (Pl. 87.) Length 7·5 in. [190·50 mm.]. The upper parts are of a dark greenish blue relieved on the crown and wings by spots of cobalt-blue and by a broad band of cobalt-blue running down the back. The lores and ear-coverts are chestnut-red ; on the side of the neck is a patch of white bounded below by a dark blue malar stripe ; the throat is white. The female is slightly, but hardly perceptibly, duller than the male, and has the base of the mandible red. The juvenile plumage is like that of the adults, but markedly duller, especially on the fore-neck and breast, where the feathers are fringed with ashy grey. The coloration of the upper surface of the kingfisher varies greatly in intensity and hue, according to the incidence of light. [W. P. P.]

2. **Distribution.**—This species is resident in the British Isles, and is on the whole fairly general in England and Wales, although it avoids the mountain districts as a rule, and is generally found in the low-lying parts, where steep earthy banks provide facilities for nesting. In Scotland it is scarcer, especially in the north, where it is almost unknown, while it is only a casual visitor to the north-west Highlands and Skye, and a very rare straggler to the Outer Hebrides. In Ireland, although very scarce, it is known to have bred in every county. On the Continent it occurs rather locally in the plains : in Scandinavia it has bred once in the south, and nests occasionally in Denmark ; while in Russia its range extends as far north



as the Kazan, Jaroslav, and Pskov governments. To the south it ranges to the Mediterranean, and a local race is said to be resident in North-western Africa, while another small form replaces it in Asia and the Malay Archipelago; but apparently it is the European form, *A. ispida ispida*, Linnæus, which is found in Western Siberia. [F. C. R. J.]

**3. Migration.**—Chiefly a resident, but said also to be a winter visitor. Although quite resident within our area, our breeding kingfishers are subject to considerable local wanderings, which vary in extent with the severity of the winter. No definite general direction has been noticed in these movements, the birds apparently merely seeking the most convenient tidal waters when the inland streams are ice-bound. Thus in Ireland it is said that "when the breeding season is over the kingfisher wanders very much, especially in frosts, when it betakes itself to tidal estuaries" (Ussher and Warren, *B. of Ireland*, 1900, pp. 109-110). But it seldom wanders far from land, if we may judge from the scarcity of records from outlying islands or light-stations. Again, we are told that in Kent the birds concentrate on the coast in September and October, returning to the inland parts of the county early in March; but in addition to this "it is probably true that in unusually severe winters a certain number of birds make their way to the Kent coast marshes from other inland counties, but this is quite exceptional" (Ticehurst, *B. of Kent*, 1909, pp. 236-38). It is claimed that the kingfisher is also something of a winter visitor to our area, arriving on the coast of Yorkshire in autumn in varying numbers; and in one particular case that is cited, on account of the earliness of the date, 4th July (1905), the bird is described as being seen two miles from shore, and coming from the north-east (cf. Nelson, *B. of Yorks.*, 1907, p. 280). As may be seen from the preceding paragraph, the kingfisher is very rarely found breeding in Denmark, Scandinavia, or Northern Russia; and it is nowhere known to be much addicted to migration; it is, for instance, of very rare occurrence on Heligoland (cf. Gätke, *Vogelwarte Helgoland*, Eng. trans., 1895, p. 420). These facts lead us to doubt that any large proportion of the kingfishers found on the Yorkshire coast in winter can really be of overseas origin. [A. L. T.]

**4. Nest and Eggs.**—The nesting-site is generally in the steep bank of a stream, though sometimes, where suitable sites are rare, it will excavate its burrow at a considerable distance from water in a dry ditch or gravel-pit. It has also been known to breed among the roots of trees by the waterside, in holes in walls, and in the stonework of a bridge over a river (O. Grabham, *Field*, June 7, 1902). The burrow is generally about 3 feet or rather less in length, with a circular chamber



at the end, and rises slightly. It is sometimes used for some years in succession, and is apparently the work of both sexes as a rule, though it is said to be occasionally only adapted by them for nesting purposes. (Pl. xxxv.) The eggs are laid at first on the bare earth, or on a few fish bones, but these accumulate while incubation progresses. The eggs are usually 6 or 7 in number, less commonly 8, or, it is said, even 9-10 in number. They are round in shape, extremely glossy, and pure white in colour. Average size of 100 eggs,  $\cdot 89 \times \cdot 73$  in. [ $22\cdot 6 \times 18\cdot 6$  mm.]. Incubation, which is said to last 14-16 days, is performed by the hen alone according to Naumann, during which time she is fed by the male. Mr. H. S. Gladstone has observed different stages of development in birds in the same nest (*Birds of Dumfriesshire*, p. 165). The normal breeding season is during the latter part of April, but occasionally the eggs are laid much earlier, probably in the case of old birds with a burrow already made. Saunders states that the young have been known to be out of the nest by 11th March, an extraordinarily early date; and on one occasion I met with fresh eggs on 31st March in Derbyshire. A second brood is often reared late in June or early in July. [F. C. R. J.]

**5. Food.**—Fish and fish-fry, aquatic insects, shrimps, and occasionally slugs, snails, and leeches. [W. P. P.]

*The following is described in the supplementary chapter on "Rare Birds":—*

The Belted-kingfisher, *Ceryle alcyon* (Linnæus).





Photo by Riley Fortune

Kingfisher's nest-hole opened to show eggs



Photo by Riley Fortune

Kingfisher's breeding haunt. The nest is in the further bank, above the spot indicated by a white cross







## THE KINGFISHER

[W. P. PYCRAFT]

According to popular beliefs, one must seek for birds of gorgeous plumage in the tropics, where animated nature presents a very riot of colour, while in more northern lands sober hues prevail. The kingfisher seems always to be forgotten in this connection, for surely no dweller under tropical skies could be more gorgeously coloured! Of all our native birds it is one of the most interesting, as it is also one of the most persecuted. It has been made the theme of fables, and of poetry, from time immemorial; for generations it has been subjected to the desecrations of the milliner and the bird-stuffer, while the malice of the fisherman has been scarcely less malignant: only by the ornithologist has it been neglected. Some facts in regard to its life-history have been harvested from the raids of the egg-collector; but of the rest of its economy we know little. We are, however, it is to be hoped, entering upon a new era in regard to the study of birds, and the following summary of the little we know of this bird may serve as a basis to a comprehensive and systematic study of every phase of its life.

To begin with, our kingfisher, like the dipper a "land" bird, has yet acquired the ability to plunge with impunity into streams, whence alone it is now able to procure its food. In its mode of fishing, however, it rather resembles the gannet, for the dipper is able to remain submerged, picking its food from the bottom of the stream, whereas the kingfisher seizes only such creatures as are to be taken from the surface. Any prolonged stay either on or in the water, indeed, is impossible; for so highly specialised for its peculiar mode of life has this bird become, that the feet are now extremely reduced in size, the front toes being united within a common sheath, almost to their tips, forming what is known as a "syndactyle"



foot, opposed to which is a short hind toe. This makes an admirable grasping foot, but walking and swimming alike are impossible. But we must be careful in generalising. Were this the only kingfisher known to us, we should regard its peculiarities of beak and feet as alone the result of adaptation to this semi-aquatic life. But there are other kingfishers, in other parts of the world, which are not aquatic, which, indeed, live remote from water, and prey upon insects, reptiles, and small mammalia. These have the same peculiarities of beak and feet. Hence the adaptation to an aquatic, or sub-aquatic life, of which we have spoken, is rather enforced by physiological than by structural modifications. Of these insect and reptile-eating kingfishers, however, some show changes in the form of the beak which are apparently the results of adaptation to secure special advantages. In one direction the beak has developed a hook at the tip, as in *Melidora*; in another, *Syma*, it is serrated along the cutting edge, as in the motmots—to which the kingfishers appear to be related; while in yet another, *Clytoceyx rex*, the beak is short, swollen, and of great width, recalling that of the boatbills and the shoebill stork (*Balaeniceps*). Neither is the remarkably short tail, so characteristic of our kingfisher, to be regarded as one of the “hall-marks” of the kingfisher tribe, for in some species, as in the belted kingfisher, it is long, while in the beautiful *Tanyseptas* the two central feathers are prolonged to form long “racquets.”

Most of us, perhaps, take but little account of the fact that our kingfisher is but one of a large family, presenting a very striking diversity in point of size, and a still more striking diversity in coloration. Yet these facts ought to be kept in mind, for thereby we shall the more readily appreciate the peculiarities of our own bird. Indeed, with this wider outlook much that now mystifies may become clear. As to size, it shall suffice to remark that the smallest of the Kingfishers is *Myioceyx leontii*,  $3\frac{3}{4}$  inches; while the largest, a veritable giant, is the laughing jackass of Australia, which attains a length of 17 inches.



The matter of coloration cannot be summarised thus briefly. Starting with birds of sombre colours, like the laughing jackass (*Dacelo*), which have a tinge of verditer-blue on the rump and wing-coverts, or with quaker-like hues of grey and white with a tinge of red, as in *Ceryle alcyon*, we get groups of species presenting, each, more or less striking combinations of grey, blue, black, and white; *H. glularis*, grey, blue, black, and red; *H. pallidiventris*, black and white—the grey intensified to black, and the red lost—as in *Ceryle rudis*, bronze-green and white—black-tinged green; *Ceryle amazonica*, vivid green and white; *Halcyon chloris*, blue and white; *H. leucopygia*, red and white; green, blue, and red, *Alcedo ispidia*; and all red, red and green, *Ceyx euerythra*. This is but a bald summary of a most marvellous series of changes of coloration, which must be seen to be properly realised. What are the factors which have determined these colour groupings? What has determined the vivid hues of our own species? Why, as in our bird, do the colours of the upper parts change with the incidence of the light, while the under surface of the body presents no such change? How is it that the female is as brilliantly coloured as her mate? What relation do these colours bear to the habits of the birds? This last question was long ago asked by Darwin in his *Descent of Man*. In his attempt at an answer he pointed out that with the kingfisher, like a number of other species—*e.g.* parrots, bee-eaters, hoopoes, both sexes are practically coloured alike, and are brightly coloured, exceptions apart; and that in all the nest is made in holes in the ground, or in trees, where the sitting bird is concealed from view; and Wallace, in later years, dwelt on the same facts. They argued that the vivid hues of the female were assumed in consequence of this habit of incubating in the dark. That is to say, they have in consequence become enabled to assume the livery of the male, because a dull coloured, protective plumage has ceased to be useful.

There is certainly much to be said in favour of this view. The case of the sheldrake, among the ducks, may be cited as an illustra-



tion, since in its case the female is brightly coloured, like the male, though a little duller, and she breeds in a burrow. The mallard and the pheasant afford instances of the opposite kind, wherein the males are brightly coloured, while the females are sombrely clad, and nest in relatively exposed places. Yet it is curious that, as we have already pointed out, in some woodpeckers the female, though nesting in holes, *loses* certain conspicuous colour patches on reaching maturity, and thereby is less like the adult male than when in the first teleoptyle plumage !

The kingfishers, again, present an interesting illustration of that strange evolution of the coloration of the sexes, and of the young, which was first pointed out by Darwin. With our own bird, as everybody knows, the sexes are barely distinguishable, and the young in their first plumage can hardly be distinguished from the adults. But in a number of species the female differs more or less conspicuously from the male, and the young from both, the adults wearing a bright, the young a dull plumage, as, for example, in species of the genera *Ceryle* and *Carcineutes*.

Bearing these facts in mind, surely, in contemplating this living jewel of our streams, we shall be the more eager to watch its every action and discover the key to some of the many riddles it represents. In its choice of haunts it is bound only by one condition, the neighbourhood of water. But it will contrive to find a congenial home in the marshy wastes of the fenlands, fishing in dykes as easily as in the more picturesque northern counties where limpid streams make their way along rock-bound gorges, with all their attendant splendour of moss and fern, straggling bushes, and tall trees. Sticklebacks and minnows, or even shrimps and aquatic insects, serve them as well as the jealously guarded trout. In Norfolk I have commonly found the kingfisher feeding on the shrimps that swarm in the brackish water which fills the dykes there, though this diet is varied by the fry of the various "coarse" fish which also abound. He exhibits all the patience of the true fisherman, sitting motionless awaiting his prey, with the



body held almost vertically. Every now and then the head is thrust forwards, and first one eye, then the other, surveys the flood. No sooner is a victim sighted than, with a sudden downward plunge, he seizes it and bears it back to the stump, or bough, as the case may be, which forms the perch. There, if it be a fish, it is beaten two or three times against the perch, and deftly swallowed head foremost. Sometimes, however, the plunge is fruitless, and sometimes I have seen him hover like a kestrel over the water, before darting down. Slugs, worms, and leeches, according to Montagu, are also eaten, but this must be under pressure, surely. Stevenson, in his delightful *Birds of Norfolk*, quotes a case of one which captured a shrew, but it cost the captor its life, for it was choked by the unusual morsel; and a similar painful death sometimes follows the capture of the ruffe and miller's-thumb, for if these be large the spines on the gill-covers catch in the bird's throat and there remain fixed.

Unfortunately this most beautiful of our native birds is nowhere very common; for it is, in the first place, of an exceedingly pugnacious disposition, and will brook no rivals on its own stretch of water, and in the second, as we have already remarked, under one pretext or another, it is remorselessly shot down. Hard winters, again, tell heavily upon its numbers, for when the streams are ice-bound many, from loss of vitality, get frozen to their perches. Some migrate to the coast, and there contrive to find a sufficiency in the rock-pools. But if these be wind-swept, and their surface continually ruffled, death from starvation is inevitable, for the bird cannot see its prey.

At all times an extremely wary bird, it is exceedingly difficult to approach, making off like an arrow before it is itself discovered. Indeed, but for its unfortunate habit of expressing its alarm by a shrill *peep, peep*, as it dashes away, its presence would often remain unsuspected, for, in spite of its brilliant coloration, it is by no means a conspicuous bird: though, when flying low over the water, the wonderful blue of the back stands out with tolerable distinctness.



The swift, arrow-like flight, just over the water, is not seldom the cause of its undoing, for those acquainted with its habits, when they find this bird frequenting a narrow stream, spread a fine silken net across, when its capture is certain. Not always, however, does it follow the winding of the stream, for sometimes it will take a short cut overland to join the bend of the river later. At such times it will often fly high up, but, as a rule, the flight is low, and surprisingly swift, having regard to the small and rounded wings. Alighting with ease, the tail is often bobbed up and down to maintain balance. According to Seebohm,<sup>1</sup> the feet are so ill-adapted for perching that the bird is obliged to sleep in the burrow, which during a part of the year serves for its nursery. There is no evidence in support of this statement, which, on the face of it, is improbable. When the nest is placed in low banks, as on the Thames, for instance, the mouth of the burrow is often under water for weeks. Where, then, could the birds rest?

This nursery is dug by the birds, both sexes taking part in the tunnelling, which is, perforce, done by the beak. It is commonly supposed, however, to avail itself of the holes dug by water-voles, where the nesting-site, as in flat and marshy country, is, perforce, near the water's edge. Montagu,<sup>2</sup> however, long ago refuted this, urging that the water-vole is a deadly enemy of the kingfisher, eating its eggs and young. This, however, can hardly be likely, since the kingfisher would be liable, when nesting in the neighbourhood and within the reach of these animals, to the same perils in a hole dug by itself. As a matter of fact, the kingfisher invariably digs for itself, and the mouth of its burrow can be recognised at a glance from that of any other creature. And this because of its shape, which is oval, and with clean-cut edges. Thereby it differs from the burrow of the sandmartin, which is cordiform, the apex upwards. The initial stage of the tunnelling is said to be performed by charging the

<sup>1</sup> Seebohm, *British Birds*, vol. ii. p. 342.

<sup>2</sup> Montagu, *Ornithological Dictionary*.



desired spot at full tilt, using the beak after the fashion of a lance, till a cavity is made large enough to afford a grip for the feet.<sup>1</sup> In country where the river runs between high banks, a greater variety of choice is possible in the selection of nesting-sites, when the hole is generally placed much higher up. As with other species, however, it exhibits a certain waywardness in the site selected for its nursery, since nests have been found in crumbling soil under the roots of a tree, holes in masonry, and the sides of gravel and chalk pits as much as a mile away from the nearest water. Occasionally, when the tunnel has been driven some distance, a stone or root is encountered which stops further progress, and a fresh start has to be made.

As a rule, such nests take the form of a long ascending tunnel, about a yard long, ending in a brooding chamber, the eggs resting on a platform of fish bones, and the hard parts of shrimps and other indigestible portions of its food. These remains are the gradual accumulations of "pellets" thrown up, as in the case of owls, hawks, and many other birds which swallow food containing much indigestible matter. According to Montagu, these accumulations are not accidental, the birds resorting to their burrows for the purpose of ridding themselves of these pellets for some time before the first eggs are laid. Yarrell describes this platform as a "nest," cup-shaped, and smooth within, and possibly fashioned by the bird's breast, or by the mere pressure of her body during incubation. Sometimes, with great care, such "nests" may be removed entire, but they generally crumble. This difficulty of preserving the bed on which the eggs are deposited entire possibly accounts for the stories of the almost fabulous value of such entire specimens. At any rate, offers of such whole "nests" are not infrequently offered to the authorities of the British Museum at perfectly ridiculous prices. Sometimes, it would seem, the deserted nest of a sandmartin is utilised, both kingfisher and sandmartin frequently breeding in the same bank, and this accounts

<sup>1</sup> *Country Life*, p. 258, 1908.



for the fact that occasionally feathers are found in the nest. The association of these two birds, and the fact that both are skilled at tunnelling, is remarkable, for neither would seem in the least degree fitted for such labours, which shows us how careful we ought to be in interpreting structure and habits. But the kingfisher works leisurely, taking two or three weeks about its task. Both sexes take part in this work, and both, according to Seebohm, incubate. The eggs are white, being laid in holes, but before being blown they have a beautifully translucent appearance, tinged with pink, due to the colour of the blood-vessels surrounding the yolk showing through the shell. The young are fed at intervals of about a quarter of an hour, and it has been stated, among others by the late Mr. Bosworth Smith, that they are nourished by regurgitated food. This was but an inference drawn from the fact that he had never seen the bird return to the nest with fish in the beak. It may be, however, that the food is "pouched," that is to say, is held within the mouth. At any rate, whole fishes are commonly found within the tunnel, that for some reason have been left there, instead of taken to the young; and Seebohm<sup>1</sup> quotes an instance of a loach,  $3\frac{1}{4}$  in. long, being found within the burrow. The condition of the burrow, and of the nest, after the appearance of the young, is extremely dirty; the fluid excrement of the young, and the remains of fish dropped in the burrow, combining to form a thick, fœtid layer of gluey consistency and green colour, most offensive to the nostrils of all but the occupants. The nest commonly rests on a similar unsavoury bed. Not seldom, it is not surprising to find, the whole passage is swarming with maggots, while the constant draining away of the more fluid portions of this mess runs down from the mouth of the burrow, and so betrays its whereabouts.

The young, which remain naked until the appearance of the contour feathers, leave the nest as soon as they are fledged, and, perched in a row on some convenient bough, await the parents returning with food. For some time indeed, after they have left

<sup>1</sup> *Bird Life and Bird Lore*, p. 397.



Plate 87

Kingfisher feeding its young

By A. W. Seaby















the nest, they are dependent upon their parents, but as soon as they are capable of foraging for themselves they are driven away.

Although the kingfisher is a resident bird, migrants seem to reach our coasts from the Continent in the autumn, and such wanderers are occasionally taken at the lightships and lighthouses along our southern and eastern seaboard. During hard weather, as we have already remarked, an internal migration takes place, inland birds making for the coast for the sake of the open water and small fish left in rock-pools at low tide. Many, however, perish in the neighbourhood of their normal haunts, freezing to death on their perches.

Of the courting habits of these birds nothing seems to be known, save that during this season the males, pugnacious at all times, now become excessively so. Nor can we surmise as to their actions at this time from what takes place among other species at this period. They seem, however, to display great solicitude for their young. The belted kingfisher, which is regarded by some as entitled to rank as a British bird, is said to be devotedly attached to its young. The female, feigning injury, will drop onto the water, and, fluttering along the surface, will endeavour to lure away intending marauders, while the male, with erected crest, flies to and fro with angry cries. So far, no similar habits have been recorded of our kingfisher under like conditions, but it is certain that so soon as the young have grown big enough to fend for themselves they are driven away by their parents.

The kingfisher of the fabulist and the poet bears no relation to the living bird; that is to say, unlike so many other birds which have been immortalised in literature, nothing in the least reflecting its habits has been set down. The pretty story of the "halcyon days" does not seem to have been inspired by any incident or phase in the life-history of the living bird, nor does the profound and widespread belief that its dead body, suspended by a thread, will serve to show from what quarter the wind blows, rest on any better foundation.



# THE CUCKOO

[ORDER: *Cuculiformes*. FAMILY: *Cuculidæ*]

## PRELIMINARY CLASSIFIED NOTES

[F. C. R. JOURDAIN. F. B. KIRKMAN. W. P. PYCRAFT. A. L. THOMSON]

**THE CUCKOO** [*Cúculus cánorus* Linnæus. Gowk. French, *coucou*; German, *Kuckuck*; Italian, *cucco*, *cuculo*].

**1. Description.**—The cuckoo may at once be recognised by the leaden colour of the upper parts, the large, fan-shaped, spotted tail, the barred under surface, and yellow, zygodactyle feet. Sexes alike. (Pl. 88.) Length 14 in. [355·60 mm.]. The adult male has the upper surface of a bluish lead colour with a faint greenish gloss. The wings and tail, however, are rather darker, the remiges being of a brownish black, and the tail dark slate colour. The two central tail feathers have a row of white spots along the shaft; the rest have a row of similar spots on each side of the shaft and along the fore edge of the inner web, and all are tipped with white. The throat and fore-breast are of a pale bluish grey, the rest of the under parts white barred with black. The inner webs of the primaries have broad white bars for about two-thirds of their length from the base. The female is like the male, but slightly smaller, and commonly has a rufous shade in the fore-neck. The juvenile (first teleoptyle) plumage differs conspicuously from that of the adult, being of a rufous brown colour, heavily barred with slaty black. The scapulars and inter-scapulars, wing-coverts, inner secondaries and primaries are tipped with white; the rump feathers are similarly tipped, and there is a white patch on the forehead and nape. The tail is marked with V-shaped bars of dark slate colour, and white spots along the shaft; it is also tipped with white. The under parts are white tipped, heavily barred with black. Frequently this juvenile dress assumes a "hepatic" phase, the general coloration being pale rust or cinnamon colour; the markings are as in the normal phase, but less conspicuous.



**2. Distribution.**—During the summer months the cuckoo is generally distributed throughout the Continent of Europe, reaching to well within the Arctic Circle and almost to the North Cape in Scandinavia, and nearly as far in North Russia. A few pairs also stay in North-west Africa, and in the British Isles it is widely distributed, ranging north to the Orkneys and Shetlands, and breeding in some numbers in the Hebrides. To the Færoes it is only an occasional straggler, and the same is true of the Canaries and Madeira. A great part of the Asiatic continent also falls within the summer range of this species, but here various allied forms are also found, while recently it has been asserted that local races are to be found in Corsica and the Balkan Peninsula. Further study is, however, necessary before these can be accepted. The winter quarters of the cuckoo lie in Southern Asia, Ceylon, the Philippines, Celebes, New Guinea, and South Africa. Here it has rarely occurred in Cape Colony, and is not common in Rhodesia, Zambesia, German W. Africa, Portuguese E. Africa, and Natal, but a good many have been recorded from the Transvaal, so that probably the greater part of our European birds winter farther north. [F. C. R. J.]

**3. Migration.**—A summer visitor. The immigrants arrive on the south coast of England "first and chiefly on its eastern half." Records of cuckoos heard in March are generally looked on with scepticism, but in early seasons a few stragglers undoubtedly do appear in the south of England in the last days of the month. During the first half of April a considerable number of "fore-runners" regularly arrive, and the main immigration sets in about the middle of that month. This continues for three or four weeks, fresh arrivals being noted as late as mid-May in some seasons (cf. *B. O. C. Migration Reports*). On an average, the first cuckoos in Yorkshire appear during the third week of April, and in North Wales during the fourth week (cf. Nelson, *B. of Yorks.*, 1907, pp. 287-89; and Forrest, *Fauna N. Wales*, 1907, p. 204). In the inland parts of Dumfriesshire the average date for the first cuckoo is about 24th April (cf. Gladstone, *B. of Dumfriesshire*, 1910, p. 171), but very few are recorded in Scotland till the very last days of the month and the first days of May: and to the north the species does not penetrate until the second week of May, as a rule (cf. *Annals Scot. Nat. Hist.*). In Ireland, stragglers are frequently met with during the first half of April, but the main influx takes place during the latter part of the month: in the north-west the cuckoo is often not recorded till May (cf. Ussher and Warren, *B. of Ireland*, 1900, p. 113). The adults emigrate at a very early date. They leave Scotland by the last week of June, and very few are seen in any part of



the British Isles after the middle of July: the majority of the young birds leave in August, but a fair proportion do not emigrate until September (cf. Gladstone, *loc. cit.*; Nelson, *loc. cit.*; Ussher and Warren, *loc. cit.*; and *B. O. C. Migration Reports*, v. p. 270). From among the various exceptional records for later dates we may cite the outstanding case of a cuckoo reported from the Pentland Skerries (off Caithness) on 7th November 1906 (cf. Paterson, *Annals Scot. Nat. Hist.*, 1907, p. 143). Similarly, on Heligoland, where the spring passage takes place chiefly in May, the adults' return passage takes place in June, and the young birds' in July and August, a space of from three to six weeks intervening (cf. Gätke, *Vogelwarte Helgoland*, Eng. trans., 1895, p. 423). The cuckoo is at least partly a nocturnal traveller, and it is frequently obtained at the light stations (cf. Nelson, *loc. cit.*; and Ussher and Warren, *loc. cit.*). It is also mainly a solitary migrant, but it is occasionally seen in flocks at the migration season, and one numbering "several dozens" has been recorded (cf. Gladstone, *op. cit.*, p. 168. See also Nelson, *B. of Yorks.*, p. 288; and *Zoologist*, 1845, 821). [A. L. T.]

**4. Nest and Eggs.**—As is well known, the cuckoo makes no nest, but is parasitic upon other species of birds. As far as we know at present the female cuckoo is polyandrous, and produces, according to Saunders, from 5 to 8 eggs in the season. The researches of the late Dr. Rey and others on the Continent, however, tend to prove that a much larger number is produced, estimated by Rey at about 20, laid on alternate days, and deposited as a rule in nests of the same species, from which one or two eggs are generally removed. Čapek is however probably nearest the truth in saying that the eggs are laid on alternate days in two clutches, the first of 5-7 eggs, and the second, after an interval, of about 4 or 5. In the case of small birds at any rate the egg is laid on the ground and afterwards inserted in the nest by the bill. In colour and markings the eggs of the cuckoo vary considerably, but it is a curious fact that the range of variation in the British Isles is considerably less than on the Continent. Many resemble tolerably closely the eggs of the foster-parents, but there are notable exceptions to this rule, the blue eggs of the hedge-sparrow being often associated with cuckoo's eggs of a totally different type. It is impossible in a brief space to describe all the different types which occur, and a glance at the plate will give a better idea than pages of description. Most British eggs vary in ground-colour from reddish, purplish, bluish, greenish to yellowish or brownish grey, and are mottled, clouded, and spotted, sometimes closely and at other times sparingly, with darker markings of various shades. Only one egg is placed in each nest, cases in which two or even three eggs have been found





Reproduced from *Country Life*, June 16, 1906

Three cuckoo's eggs in a hedge sparrow's nest



Photo by H. Moore

Young cuckoo in wren's nest



Photo by W. Bickerton

Young cuckoo in a reed-warbler's nest



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in one nest being due to oviposition by two or more hens. (Pl. E.) Average size of 626 eggs, measured by Rey,  $\cdot 88 \times \cdot 65$  in. [ $22\cdot 4 \times 16\cdot 5$  mm.]. The incubation period lasts for 12-13 days, and soon after it is hatched the young cuckoo proceeds to eject its companions from the nest, hoisting them one by one on its back to the edge and throwing them over the side. [F. C. R. J.]

**5. Food.**—Various insects and their larvæ, notably hairy caterpillars (pp. 485-86) and beetles. It also takes spiders, and occasionally seeds, bud-scales, grass, and the eggs of earthworms and insects (Naumann, Prévost, E. Rey, Eckstein, Newstead). For the food of the young, see p. 485. [F. B. K.]

**6. Song Period.**—From April till July (see p. 464). [F. B. K.]

*The following are described in the supplementary chapter on "Rare Birds":—*

Great Spotted-cuckoo, *Coccytes glandarius* (Linnæus).

Yellowbilled-cuckoo, *Coccyzus americanus* (Linnæus).

[Blackbilled-cuckoo, *Coccyzus erythrophthalmus* (Wilson).]



THE CUCKOO<sup>1</sup>

[F. B. KIRKMAN]

## I

The examination candidate's assertion that the cuckoo is "the bird that does not lay its own eggs," trespasses, no doubt, outside the region of fact. But though the cuckoo has not supernatural powers, its habits are so peculiar that they have become an object of exceptional interest not only to ornithologists but to the public at large. This interest has shown itself in an enormous literature, far exceeding that relating to any other species, or even to any other family of birds. From this it has been possible to extract a large amount of trustworthy information. There are still important gaps to be filled in, and the fundamental problems raised by the facts are as far from solution as ever, but enough is known to enable the cuckoo's biographer to give a fairly complete account of the chief events of its life.

Most of the birds arrive on our shores from their winter quarters in Africa during the month of April. A few individuals arrive earlier, and some again as late as mid-May. The males, as is the case with probably all migrant species, are to be found in their breeding-places several days before the females.<sup>2</sup> There can be little doubt that they return each year to the same place, in this, again, resembling other migrant species. One cuckoo, recognised by a peculiarity in its note, was observed by Naumann to come back to its former haunts twenty-five years in succession.<sup>3</sup> Others have made similar observations.<sup>4</sup>

The cuckoo's favourite resort is open woodland, but it may be

<sup>1</sup> The cuckoo's foster-parents and eggs are treated separately (p. 487).

<sup>2</sup> "According to reliable observations the female arrives 8-10 days after the male."—J. A. Link in the *Verhandlungen der Ornith. Gesellschaft in Bayern*, 1903, 142.

<sup>3</sup> *Vögel Mitteleuropas*, iv. 398.

<sup>4</sup> *Zoologist*, 1889, 33 (A. Walter).



found breeding almost everywhere, among sandhills, for instance, and also on grouse-moors.<sup>1</sup>

Each cuckoo confines itself to a more or less well-defined area, from which it probably only issues, if a cock, when in pursuit of a hen. In this area it has its favourite trees and perches. It may frequently be seen flying from one to the other, and, day after day, its note may be heard coming from the same spot. The bird with a peculiarity in its voice, referred to above, occupied a district, of which Naumann's own wood was the centre, which embraced three or four villages. One year another cuckoo arrived before the rightful owner and took possession. On the appearance of the latter, there followed a series of fierce combats, which resulted finally in a division of the original district into two parts, an arrangement which appears to have been continued in the following years.<sup>2</sup>

It seems reasonable to assume that this subdivision of territory may occur in the case of any species of which the individuals confine themselves during the breeding season within definite boundaries. If it occurs before the arrival of the female, she has the alternative either of yielding to the new order and throwing in her lot with one of the males, or else of continuing to fly freely about the whole of the original territory, and accepting the attentions of both males. The former is the usual habit of most species, judging from the fact alone that they are monogamous. The latter is unquestionably the course that would be pursued by the hen cuckoo, for it is her habit to mate with more than one cock.<sup>3</sup> The particular hen that returned to the locality referred to by Naumann would have had no difficulty in adapting herself to the new circumstances. The district she frequented may,

<sup>1</sup> T. A. Coward, *Fauna of Cheshire*, i. 268; Droste-Hülshoff, *Vogelwelt der Nordseeinsel-Borkum*, 84.

<sup>2</sup> *Loc. cit.*

<sup>3</sup> In reference to the polyandry of the cuckoo, Bailly writes: "Pour m'assurer d'un fait aussi important pour l'histoire du coucou, il a fallu me soumettre pendant plusieurs printemps consécutifs à examiner très minutieusement cet oiseau pendant ses ébats amoureux. C'est alors que j'ai vu fréquemment . . . des femelles laisser des mâles qui venaient de les féconder pour se rendre directement aux désirs des autres mâles qui les réclamaient dans le même canton."—*Ornithologie de la Savoie*, i. 381. See also Lilford's *Birds of Northants*, i. 251: "The hen accepts the attentions of an indefinite number of the other sex."



indeed, already have comprised those of other males beside the two in question. Brehm noted a female cuckoo—easily recognised by a broken feather in her tail—which visited the districts of no less than five males.<sup>1</sup> How complicated the cuckoo territorial system may become can easily be realised by imagining what is well within the bounds of possibility—the advent of a second female into the district occupied by these five males. If it were divided between the two hens, and their boundaries happened to traverse the estates of two or more males, there might result not only polyandry but promiscuity. All the evidence points, however, to an excess of males, and hence to polyandry as the rule, the result being to substitute for the usual system of one pair to each breeding-area a system of comparatively small estates occupied by males, and of comparatively large estates occupied by females. How far the boundaries of these two sets of estates coincide or interlace is a matter that still requires investigation.

Whether the male cuckoo has a love-display apart from that with which he accompanies his familiar note is not recorded. His display, when giving utterance to the latter, varies to all seeming according to the intensity of his feelings at the time. In moments of high excitement he raises and lowers his body, puffs out his feathers, fans his tail, and turns himself about in the approved fashion of the domestic pigeon.<sup>2</sup> He sometimes moves the body and tail from side to side, frequently erects the latter to various heights, and also puffs out the feathers of the throat. When in a milder mood, he is content, according to my observation, merely to droop the wings, which he almost invariably does when calling, the rest of the body being in its normal position of repose, except for the customary raising and lowering of the head at each “cuckoo,” the latter uttered with the bill closed, or almost so, as shown in Mr. Seaby’s drawing.

The “cuckoo” itself is usually to be heard from the middle of April to the end of June, occasionally later. According to the

<sup>1</sup> Dresser, *Birds of Europe*, v.

<sup>2</sup> *British Birds*, ii. 239 (T. T. MacKeith).



Plate 88

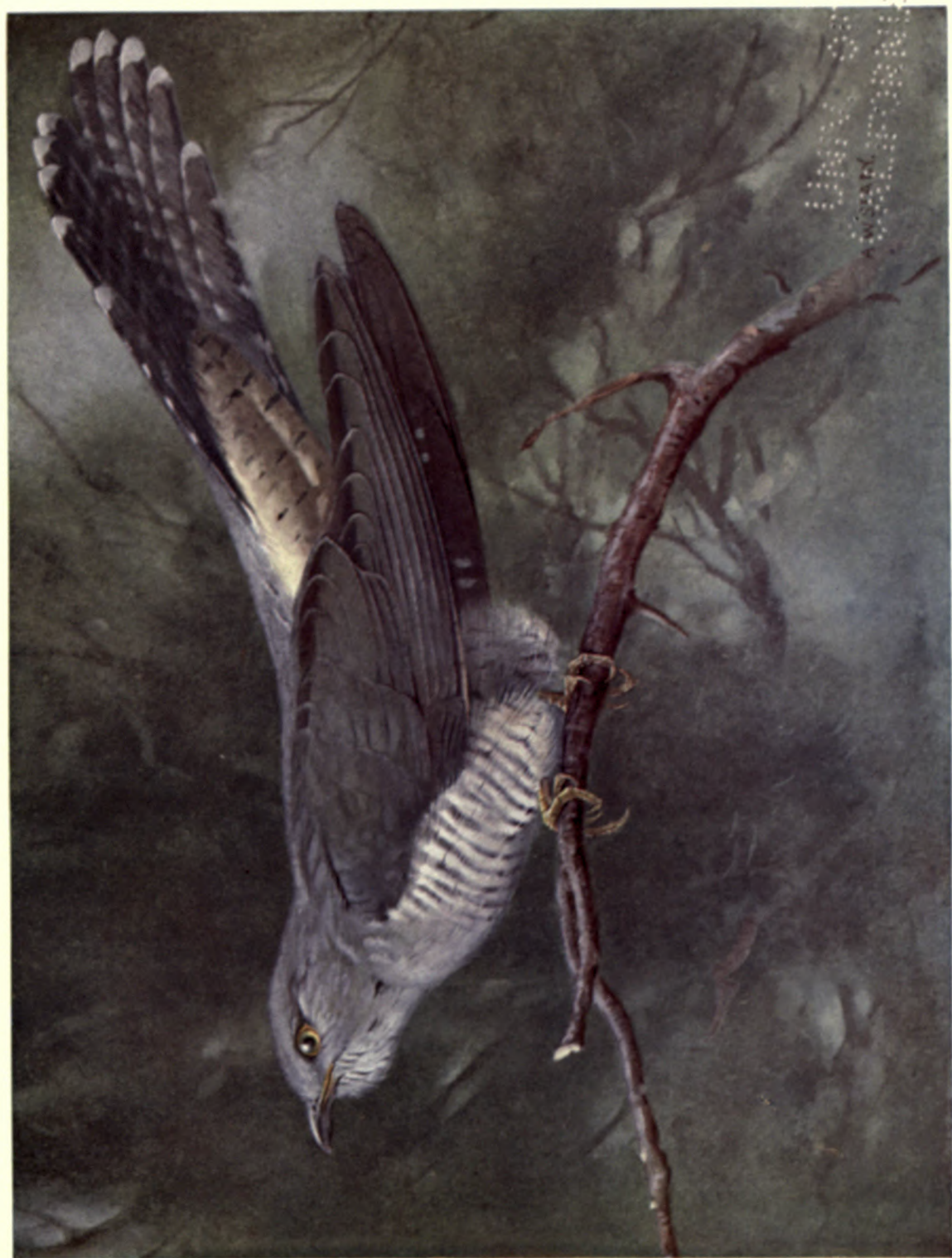
Cuckoo uttering its note

By A. W. Seaby















legendary literature of the subject, endorsed by at least one standard work, the cuckoo in June "changes tune." This statement evidently refers to the tri-syllabic note—the rapid, excited *cuck-cuck-oo!* and its variations, and is not exact. The note in question is heard in May, and is probably uttered by the male when excited by the presence of the female.<sup>1</sup>

The remaining notes of the cuckoo have yet to be closely studied. The best known is one which may be said to resemble the noise that would be made by a person with a rasping cough trying not to laugh, but with indifferent success; it sounds something like a rapid hoarse spluttered *kwow-wow-wow*, and is one of the most singular noises uttered by any animal. It is frequently heard preceding the "cuckoo." On at least three occasions I have noted it uttered by itself; on the first the bird was flying past alone; on the second, it was being pursued by small birds;<sup>2</sup> and on the third it was in company with two others of its own species, one a female. The male has also been heard to utter a hissing note when in pursuit of the hen.<sup>3</sup>

A third note, the clear bubbling or laughing sounds, is taken to be that of the female. Whether it is peculiar to her, and whether she ever utters the ordinary "cuckoo," are uncertain.

In addition to these notes, an individual has been known to utter in captivity "an angry chattering" when repelling the amicable advances of a tame dove. This expression of displeasure was the only note heard from him—a bird of the year—"excepting on three or four occasions, when he was heard to utter a loud sound like the sharp bark of a little dog."<sup>4</sup>

<sup>1</sup> *British Birds*, ii. 197, 240. I have also heard it in May.

<sup>2</sup> With respect to the mobbing of the cuckoo by small birds, the general view is that the cuckoo owes these unpleasant attentions to its resemblance to the sparrow-hawk. In the *Zoologist*, 1911, 236, Mr. C. B. Moffat points out, however, that in Ireland the cuckoo is mobbed only, as a rule, according to his observation, by meadow-pipits—that is, by "the only species of bird that in Ireland is commonly victimised or duped by the cuckoo." His view is that the cuckoo is regarded as an enemy, quite apart from its hawk-like appearance.

<sup>3</sup> F. C. R. Jourdain (*in litt.*).

<sup>4</sup> Montagu, *Dictionary of Birds*, quoted from the *Zoologist*, 1844, 655.



## II

It is when we turn to the nesting-habits of the cuckoo that we open the strangest chapter in its life-history. As is well known, it deposits its eggs in the nests of other species, and leaves to them the duty of rearing its offspring. It thus frees itself entirely from the labours of nest-building and incubation, and the still more arduous work of feeding the young. It is left only with the responsibility of finding nests in which to deposit each of its eggs, and possibly also of taking certain precautions to ensure the upbringing of its young, of which more later.<sup>1</sup>

The cuckoo has been seen flying over fields and along hedges apparently searching for nests, but the recorded instances which leave little or no doubt that it was actually thus engaged are few. In one case a cuckoo was observed to enter two bushes in turn, harried the while by a pair of sedge-warblers. When it had flown away, search revealed in the second bush a nest containing two sedge-warbler's eggs. Next day the same nest contained a cuckoo's egg in addition to two sedge-warbler's, and outside it on the ground lay a third sedge-warbler's egg broken. The inference is that the cuckoo found the nest on one day and laid an egg in it on the next. That it was the same bird is far more likely than not, for cases in which two hens frequent the same nests are comparatively rare.<sup>2</sup> On another occasion a meadow-pipit was seen to fly with nest material onto a meadow. A cuckoo then appeared, hovered a while over the spot, alighted to rise and hover again a little farther off, and alighted again after the return and departure of the meadow-pipit. It then flew away. Search revealed an almost finished, well-hidden nest of a pipit species.<sup>3</sup>

The foregoing instances provide evidence that the cuckoo

<sup>1</sup> A German ornithologist records that he saw a cuckoo incubating its eggs and feeding its own young (*Gartenlaube*, xxxvi., 1888. Translated in the *Ibis*, 1889, and the *Zoologist*, 1889, 215). But the authenticity of the account has been discredited (*Journal für Ornithologie*, 1889, 33-46. Translated in the *Zoologist*, 1889, 219).

<sup>2</sup> J. A. Link, quoting A. Walter, in the *Verhandlungen der Ornith. Gesellschaft in Bayern*, 1903, 128.

<sup>3</sup> J. A. Link, *op. cit.*, p. 127.



searches for nests before she is ready to lay an egg. As she often, if not usually, lays the latter on the ground before depositing it in a nest, it is possible that she may also search for the nest after laying, but there is no evidence that she does so. When a nest is built on the same site year after year, a cuckoo will return to it, thus saving herself considerable trouble.<sup>1</sup>

The actual deposition of the egg in the nest, which may take place at any time of the day,<sup>2</sup> has been described in detail more than once. In one instance the male bird was observed to be present as well as the female. He is stated to have made on the ground a rough nest of loose earth. The hen bird then flew down, "and appeared to do as much as her mate had done, scratching the loose ground for some time. She then sat quite still for perhaps ten minutes." When she had laid the egg, she was joined by the cock, who meanwhile had been flying excitedly round an elm tree some thirty feet distant. She took the egg in her beak, and, with the cock, flew to the elm, where she was seen distinctly to place the egg in a wren's nest which stood five feet from the base of the tree.<sup>3</sup> Bailly, again, saw a hen cuckoo, after driving a robin from its nest, which was placed in a hole, descend to the ground, lay her egg, seize the egg in her beak, and push her head and neck into the hole, leaving her egg in the nest.<sup>4</sup>

In the first of the two instances given the cock was not only present, but played an active part in the proceedings, the most remarkable feature being his preparation of the temporary nest (if it was a nest), which recalls a somewhat similar action on the part of the male nightjar related on page 370 above. The cock has been observed on more than one occasion to accompany his mate when engaged in depositing her egg, but this, as far as I am

<sup>1</sup> For instances see Yarrell's *History of Birds*, 4th edit., ii. 403; D'Urban and Matthew, *Birds of Devon*.

<sup>2</sup> J. A. Link, *op. cit.*, p. 125.

<sup>3</sup> *Field*, 1805, lxxxv. 929 (A. Malcolm Yeats). It has been suggested to me that the birds were dusting themselves.

<sup>4</sup> *Ornithologie de la Savoie*, i. 387. Cf. also *Field*, 1862, xix. 566; *Zoologist*, 1900, 262; *Zoologisches Garten*, 1866, 374; J. A. Link, *op. cit.*, p. 130.



aware, is the only case in which he is said to have given her assistance.<sup>1</sup>

It may here be noted that the abnormally small size of the cuckoo's egg makes it easy to hold it in the beak, possibly also in the pouch under the tongue. How small it is compared with the size of the bird may be judged from the fact that it is not much bigger than that of a hedge-sparrow, though this species is considerably less than half the size of the cuckoo. The unusual hardness of the shell is another advantage, especially when the bird happens to be pushing its head and neck in through the narrow entrance of a closed nest.

In the case of closed nests it is clearly impossible for the cuckoo to introduce its egg other than by putting it in with its beak. But this necessity would not apply in the case of open nests strong enough to support the bird if it sat upon them. That it occasionally does so is certain. Naumann had the good fortune to see one lay its egg directly in the nest of a reed-warbler, and he noted that it maintained its position with the aid of wings and tail, which were pressed against the reeds surrounding the nest.<sup>2</sup> Another was seen to sit on a pied-wagtail's nest, and there lay its egg.<sup>3</sup> In a third instance, the bird appears to have made an attempt to lay in the nest of a yellow-hammer, but without success. The nest, after the cuckoo had left it, was found with the sides pressed apart, and the lining outside, presumably caught in the cuckoo's claws and thus pulled out. The cuckoo's egg also lay outside.<sup>4</sup> Though it is clear from what precedes that the cuckoo has two methods of introducing its egg into the nests of its victims, to what extent each is used is a question to which no satisfactory answer can yet be given.

When putting its egg into a nest, the cuckoo is in the habit of removing one or more of those of the owner. These are frequently found on the ground beneath a nest which contains a cuckoo's egg. An instance is given above (p. 466). The bird has also been caught

<sup>1</sup> Naumann, *Vögel Mitteleuropas*, iv. 404; J. A. Link, *op. cit.*, p. 135.

<sup>2</sup> *Vögel Mitteleuropas*, iv. 406.

<sup>3</sup> *Field*, 1897, lxxxix. 927.

<sup>4</sup> J. A. Link, *op. cit.*, 134.



in the act. One was observed to quit a hedge-sparrow's nest with an egg of this species in its beak, for which it had substituted its own.<sup>1</sup> Occasionally all are removed except one, the cuckoo's egg itself being sometimes among those ejected, a fact which gives little proof of intelligent discernment.<sup>2</sup> In certain cases the eggs of the victimised species are left unremoved.<sup>3</sup>

The ejection by the cuckoo of one or more of its victim's eggs is not the least remarkable of its habits, seeing that the necessity for such a proceeding is by no means evident. One could understand it if the bird were in the habit of placing its egg in nests containing a full clutch, for it might then be necessary to make room, but this is not its usual course. Nor can I find any clear evidence to show that if an egg were not removed the nest would be deserted. Again, the removal of the egg would be intelligible if the cuckoo profited by the occasion to eat it, but its habit is to leave it untouched. That it occasionally eats eggs is proved by the discovery of fragments of shell in its stomach, but such finds are rare. In fifteen specimens examined by Mr. Newstead, one only contained fragments of shell, which were recognised as those of a meadow-pipit.<sup>4</sup> None were found in the thirty-four examined by Eckstein.<sup>5</sup> The cuckoo found with the remains of at least seven eggs in its stomach, of which two were robin's, must have been a bird of abnormal tastes.<sup>6</sup>

The cuckoo does not confine itself to depositing its egg in nests which already contain those of the species victimised. Its eggs are found in old and deserted nests,<sup>7</sup> and also in those in which the eggs of the owner have not yet been laid, and sometimes before the building is completed.<sup>8</sup> There was no egg in the wren's nest in which the

<sup>1</sup> *Field*, June 6, 1908, 932 (F. Banister). See also Nelson, *Birds of Yorks.*, i. 289.

<sup>2</sup> J. A. Link, *op. cit.*, p. 161.

<sup>3</sup> See p. 470, and note 2.

<sup>4</sup> *Food of some British Birds*, p. 67, No. 459.

<sup>5</sup> Naumann, *Vögel Mitteleuropas*, iv. 401, where the stomach contents of the thirty-four specimens are given in detail.

<sup>6</sup> *Field*, 1882, lix. 66 (H. L. Wilson).

<sup>7</sup> J. A. Link, *op. cit.*, pp. 160-61. The cuckoo lays also in deserted nests which contain eggs. An instance is given in *British Birds*, i. 326 (J. F. Green), of a cuckoo depositing her egg in a hedge-sparrow's nest containing one egg, which had been deserted three weeks previously.

<sup>8</sup> Naumann, *Vögel Mitteleuropas*, iv. 153 (in the hardly finished nest of *Sylvia locustella*); *Journal für Ornithologie*, 1809 (Homeyer); J. A. Link, *op. cit.*, p. 153.



cuckoo above referred to was seen to place her egg after laying it on the ground in a rough nest previously prepared by her mate. Such nests appear to be usually deserted by the owner, except, it is said, by species like the wagtail, hedge-sparrow, robin, some warblers, which are the most often victimised.<sup>1</sup> The cases in which they are not deserted probably account for most of the relatively rare occasions on which a cuckoo's egg is found together with a full clutch of the owner, for the fact that the cuckoo laid first would probably save the eggs of the other from ejection. It does sometimes happen, however, that the cuckoo deposits her egg after the full clutch has been laid. An instance is given of her doing so in a white-wagtail's nest, from which, moreover, she ejected no eggs. Another cuckoo's egg, quite fresh, was found in the nest of the same species, which contained four of its own eggs at least ten days incubated. Similar instances could be given.<sup>2</sup>

The nest which the cuckoo usually chooses is one in which there are eggs that the owner has not begun to incubate, the reason given being that she hesitates to drive an incubating bird off the nest.<sup>3</sup> The reason is not, however, convincing, unless we assume that the cuckoo has two or three nests in mind to select from when ready to lay its egg, and that, finding an incubating bird on one, it would then go to the next. Moreover, an instance, already noted (p. 467), is given by Bailly from his personal observation of a cuckoo driving a robin from its nest. He adds that he saw another cuckoo drive a whinchat from its nest on the ground by swooping down upon it.<sup>4</sup>

The cuckoo's approach to a nest in which she intends to deposit an egg is probably always actively resented by the rightful owners, if present. A robin is recorded as having got hold of the trespasser by the back of the neck, to which he hung for a few seconds with fierce

<sup>1</sup> J. A. Link, *op. cit.*, p. 152.

<sup>2</sup> J. A. Link, *op. cit.*, pp. 154, 156, 158, 159; Naumann, *Vögel Mitteleuropas*, iv. 405.

<sup>3</sup> J. A. Link, *op. cit.*, p. 158.

<sup>4</sup> *Ornithologie de la Savoie*, i. 387 (footnote).



tenacity. The cuckoo threw her head back, opened her great orange-coloured mouth, and squawked loudly in protest, thus making clear that she was not carrying her egg in her beak. Possibly she carried it, like the Crows, in the pouch under the tongue. She placed it in the robin's nest in spite of their resistance, which appeared to cease during the act of deposition itself.<sup>1</sup> This was also the case with a pair of shrikes. When the cuckoo was at the nest they remained to all appearance quite indifferent, though previously they had shown every sign of resentment.<sup>2</sup>

The question of the origin of this strange parasitism of the cuckoo is one of extreme difficulty, to which it is impossible to do justice within the limits of the present chapter. The answer, if ever reached, can be the result only of a careful comparative study of the various degrees of this form of parasitism as manifested not only in the behaviour of different species of cuckoo, but of species belonging to quite different families and orders, such, for example, as the cowbirds (*Molobrus*), which belong to the *Passeres*.

A few examples of the variations in parasitism must here suffice. The yellowbilled-cuckoo (*Coccyzus americanus*) usually builds a nest and incubates its eggs. The nest is a frail platform, off which the eggs easily roll. It is itself liable to fall owing to its slightness, which is said to be the reason why this cuckoo occasionally lays its eggs in the nests of other species, including that of the black-billed-cuckoo. The latter returns the compliment, and is still more decidedly parasitic in its habits.<sup>3</sup> One of the American cowbirds (*M. bonariensis*) occasionally attempts to build nests, but leaves them unfinished, and drops its eggs into the nests of other species, often laying several in the same nest.<sup>4</sup> Another cowbird (*M. ater*) appears to be as parasitic as our cuckoo. It puts its eggs in the nests of other species, sometimes in old, deserted, or unfinished nests; sometimes, again, if pressed, on the ground. From one to seven cowbird's eggs

<sup>1</sup> *Zoologist*, 1900, 262-4 (A. H. Meiklejohn).

<sup>2</sup> *Journal für Ornithologie*, 1859, 106.

<sup>3</sup> Charles Bendire, *Life-Histories of N. American Birds*, 1895, 19.

<sup>4</sup> W. H. Hudson, *Argentine Ornithology*.



may be found in one nest, probably laid by different birds. The eggs of the victim may be ejected or punctured either by the beak or claws of the cowbird. As the eggs are found in hole-nests, the species must, occasionally at least, lay the egg outside the nest and then carry it in the beak.<sup>1</sup>

Some of the explanations of the cuckoo's parasitism that have been offered are mainly interesting as illustrating the chief difficulty which besets the question, that of distinguishing between cause and effect. An example is supplied by Jenner's view that the short stay of the cuckoo—about three months—prevents it from performing its parental duties, but its short stay may be an effect and not a cause of the parasitism.<sup>2</sup> The same difficulty applies to the view that explains parasitism by polyandry.<sup>3</sup>

One might argue that our cuckoo has completed the stage through which the American yellowbilled-cuckoo appears to be going. It has found it more advantageous to use the nests of others than build an unsafe nest of its own. This view overlooks two difficulties. All cuckoos would not build equally badly, and it seems unreasonable to assume that natural selection would lead to the extinction of the individuals building nests that were adequate to their purpose in favour of individuals compelled by their incapacity to lay in the nests of other species; it is difficult to see what advantage the offspring of the latter would have over those of the former. Further, the habit of occasionally laying eggs in the nests of other species surely comes under the head of an acquired character—one gained by the individual during the course of its experience. Can such be inherited?

The cause of the parasitism of the cuckoo, whatever it may be, must have been exceedingly potent in its operation, for not otherwise could it have completely annihilated those deep-rooted parental

<sup>1</sup> Bendire, *op. cit.*, p. 436.

<sup>2</sup> The statement that certain non-migratory species are parasitic cannot be used as an argument against Jenner's view till it is shown that these species were always non-migratory. They may have become parasitic during a previous migratory period.

<sup>3</sup> The view that the somewhat peculiar position of the cuckoo's stomach makes the function of incubation difficult has long been discredited, it having been shown that other species which do incubate have the same peculiarity.



instincts which are so marked a characteristic of birds, and of all the higher animals.

### III

After about twelve days' incubation the young cuckoo is born, and sooner or later it proceeds to eject from the nest the eggs or young of its foster-parent. The first who appears to have noted this curious fact was a French doctor, Lottinger, in a work entitled *Histoire du coucou d'Europe* (p. 18), published in 1795.<sup>1</sup> He did no more, however, than record that an egg previously inside the nest (a robin's) was in his absence hoisted on to its edge. He put it back, and shortly afterwards saw it again on the edge. He inferred that the young cuckoo, which was alone, had ejected the egg *en se remuant*. The date of the observation was July 1782.

It remained for Dr. Edward Jenner to witness and describe for the first time the actual process of ejection.<sup>2</sup> On June 18, 1787, he noted a hedge-sparrow's nest containing four eggs, of which one a cuckoo's. Next day, June 19, the same nest contained one young cuckoo and one hedge-sparrow. He saw the latter ejected. His own description of the incident is as follows: "With the assistance of its rump and wings, the young cuckoo contrived to get the bird upon its back, and making a lodgment for its burden by elevating its elbows, clambered backwards with it up the side of the nest till it reached the top, where, resting for a moment, it threw off its load with a jerk, and quite disengaged it from the nest. It remained in this position for a short time, feeling with the extremity

<sup>1</sup> Lottinger published in 1775 his *Mémoire sur le coucou*, which contains no indication that he realised there was ejection by the young cuckoo. It is largely concerned with the behaviour of birds when eggs of other species are placed in their nests. Lottinger's observations were corrected and supplemented by those of Paul Leverkühn in his *Fremde Eier im Nest*, 1891. A copy both of the *Mémoire* and a German translation of it are to be found at the British Museum. A copy of the *Histoire du coucou d'Europe* is in the Newton Library at the Cambridge Zoological Museum.

<sup>2</sup> *Philosophical Transactions of the Royal Society of London*, vol. lxxviii., 1788, 219-237. The account, entitled "Observations on the Natural History of the Cuckoo," is in the form of a letter written by Jenner on December 27, 1787, and read to the Royal Society by John Hunter on March 13, 1788. It contains other interesting observations on the cuckoo besides the one above referred to.



of its wings, as if to be convinced whether the business was properly executed, and then dropped into the nest again." He afterwards put in an egg, and this was also thrown out. Subsequently he repeated the experiment several times in different nests. His statements have in recent times been verified by Mrs. Hugh Blackburn<sup>1</sup> and others, and in 1899 the evidence was completed by the excellent photos published in the *Feathered World* (July 14) by Mr. John Craig and Mr. J. Peat Millar, of which two are reproduced on Plate xxxvii.

The stages in the ejection are, generally speaking, as follows: (1) the nestling cuckoo manages to get the egg or bird on to its back, where it is kept in position by the featherless arms, and partly by the fact that in the middle of the back there is a curious hollow, of which more later.

(2) It climbs backward up the side of the nest, legs well apart, and head down, as shown in Mr. J. Peat Millar's photograph (Plate xxxvii.). Then, standing partly in the nest or actually on its edge, it pitches its burden off with a jerk. If the nest is deep it may only be able to hoist the object on to the edge.<sup>2</sup> Sometimes it fails completely, and the victim or egg rolls back into the nest, to be once more lifted up, and perhaps again to roll back before eviction takes place.<sup>3</sup> It will perform the act of eviction three times in succession in one minute, if the victim is put back in the nest.<sup>4</sup> Its success or failure no doubt depends upon its age and strength, and its inherited physical fitness. It depends also on the shape, depth, and position of the nest. To eject something from the deep nest of a reed-warbler or the domed nest of a wren would, for

<sup>1</sup> *Birds of Moidart*, 1895.

<sup>2</sup> For an example see *Zoologist*, 1905, 164 (J. H. Gurney).

<sup>3</sup> See, for instance, Hancock's account in the *Transactions of the Northumberland and Durham Natural History Society*, 1886, viii. 210, 217; and W. H. Hudson, *Hampshire Days*, p. 19. An instance is recorded in which a two-day-old nestling fantailed-cuckoo of Australia (*Cacomantis flabelliformis*), after hoisting a nestling scrub-wren on to the edge of the entrance of the nest, reared itself still further, at the same time straining its head in the other direction to preserve its balance, then placed its arms outside the nest, and so, with a final heave, in which the "Pope's nose" played the most important part, ejected the victim clear of the nest (*Emu*, 1907, 120, A. G. Campbell).

<sup>4</sup> Link, *op. cit.*, p. 95, quoting observations of Walter, Friederich, and Müller.





Photo by J. Peat Millar

Young cuckoo in a nest, with egg in position for ejection



Photo by J. Peat Millar

Young cuckoo ejecting chick







example, be more difficult than to do so from the nest of a skylark. If, again, the nest is built in a bank, the object, if ejected on the upper side, would simply roll back, as in the case observed by Mr. W. H. Hudson and described below.<sup>1</sup>

(3) Having evicted, or failed to evict, the nestling or egg, the cuckoo sinks back exhausted into the nest, either at once or after feeling about with the extremities of its naked arms to see, it is said, if the business has been done. It has often been seen to feel in the same way for its victim before starting to eject.<sup>2</sup> The great sensitiveness of the arm extremities, which seems to compensate for the creature's blindness, has often been commented upon. They serve for hands, and, regarded structurally, that is what in fact they are, the wing of the bird being nothing but the reptilian fore-limb adapted to purposes of flight. The young cuckoo has been seen to eject not only eggs and nestlings, but other objects placed in the nest, such as bits of dried earth, sticks, and the like.<sup>3</sup>

If two young cuckoos are born in the same nest, one is usually ejected. Jenner records two instances. In one the struggle began one morning a few hours after birth and lasted till the following afternoon, when the weaker was turned out as well as the egg and nestling of the hedge-sparrow owning the nest. During the struggle each carried the other several times nearly to the top of the nest, then only to sink back exhausted.<sup>4</sup> Mr. Craig also witnessed a desperate struggle between two which were not two days old. The ejected cuckoo was put back, and the fight began again. "Sometimes the birds put the bill or head against the opposite side of the nest for more pressure when commencing to climb. Several times the top bird tumbled over the head of the other, like a rider falling over the head of a horse. After a short respite the birds became extremely restless, and again commenced the struggle." Next day one was

<sup>1</sup> P. 477.

<sup>2</sup> Hancock, *op. cit.*

<sup>3</sup> *Zoologist*, 1886, 245 (R. P. Harper).

<sup>4</sup> *Philosophical Transactions of the Royal Society*, 1788, lxxviii. 228.



again found outside.<sup>1</sup> On rare occasions both cuckoos have been found growing up side by side in the nest. In these cases it may have happened that neither was able to eject the other.<sup>2</sup> On one occasion two fully fledged young cuckoos were seen in the act of being fed by one and the same meadow-pipit, a fact which points to their having been reared in the same nest.<sup>3</sup> The presence of two young cuckoos in the same nest is assumed to be the result of laying by two different females, for when the eggs are found they almost invariably prove to be of distinct types, and it is practically certain that those laid by any given female are of the same type.<sup>4</sup> Rarely three eggs are found.<sup>5</sup> Adolf Walter found three in a wren's nest twice in one week, and ascribed this to the decrease of wrens and the increase of cuckoos in the district.<sup>6</sup>

Sometimes, when the young cuckoo is hatched after the offspring of the foster-parent, it finds them too big to eject. At least eight such cases have been recorded, one by Buffon, who found a young cuckoo in a nest with two nearly fledged thrushes.<sup>7</sup> Probably ejection is occasionally impossible when the cuckoo is born in a hole-nest.

Among the questions arising out of the ejection of eggs or nestlings by the young cuckoo which still await a definite answer, is that of the stimulus which moves the cuckoo to action. What causes this blind and seemingly helpless creature to initiate and perform a singularly difficult feat—keeping the victim on its back while it scrambles backward up the inside of the nest, jerking the burden off without losing its own balance—requiring a degree of strength that seems

<sup>1</sup> Quoted by A. H. Japp, *Our Common Cuckoo*, p. 47. See also *Zoologisches Garten*, 1868 (Adolf Müller); and Macgillivray, *Hist. of Birds*, iii. 109 (quoting from Weir).

<sup>2</sup> *Zoologist*, 1865, 9628 (E. T. Gunn); *Magazine of Natural History*, viii. 287 (H. Turner).

<sup>3</sup> *British Birds*, iii. 164 (E. A. Wallis).

<sup>4</sup> See on pp. 496-97. For the evidence see Link, *op. cit.*, pp 146-49; Coward, *Fauna of Cheshire*, i. 268.

<sup>5</sup> Link, *op. cit.*, p. 150, quoting from the *Journal für Ornithologie*, 1874, 80 (H. Thiele), and *Ornith. Monatsschrift*, 1893, 464; *Zoologist*, 1886, 368; 1906, 276 (J. G. Tuck); *Country Life*, June 16, 1906 (A. C. Elwes), with photo of a hedge-sparrow's nest, containing three cuckoo's and four hedge-sparrow's eggs; *British Birds*, i. 325. Mr. Jourdain tells me there is also a robin's nest with three eggs of *C. canorus* in the Hungarian National Museum. See also pp. 497-98.

<sup>6</sup> Link, *loc. cit.*

<sup>7</sup> Link, *op. cit.*, pp. 172, 174 (six cases); *Field*, 1900, xcv. 771, 949 (two cases).



little short of supernatural? It would be absurd to suppose that the bird exercises any foresight in the matter; that it knows its chances of survival depend upon its receiving the undivided attention of its foster-parents. This is the effect of its action, but the cause must be some immediate and very potent stimulus. The only account which clearly indicates what this stimulus may be is that of Mr. W. H. Hudson in his *Hampshire Days* (p. 16), by far the most interesting and important written since the days of Jenner.

Mr. Hudson found a robin's nest containing four eggs, one being a cuckoo's. On the afternoon of May 27 the young cuckoo hatched out. At 8 A.M. on the 29th one robin's egg had been ejected, a newly born young robin and the third egg being still in the nest. "The cuckoo occupied the middle of the deep, cup-shaped nest, and his broad back, hollow in the middle, formed a sort of false bottom; but there was a small space between the bird's sides and the nest, and in this space or interstice the one unhatched egg that still remained and the young robin were lying." The cuckoo appeared to be very sensitive to the pressure of these two bodies against his sides; of the egg especially, which was hard and unyielding; "he was continually moving, jerking and wriggling his lumpish body this way and that, as if to get away from the contact. At intervals this irritation would reach its culminating point, and a series of mechanical movements would begin, all working blindly but as surely towards the end as if some devilish intelligence animated the seemingly helpless infant parasite." In a space of eight minutes he made four separate efforts to get rid of the egg, but as he pushed or carried it up the wrong or upper side of the nest, it rolled back each time.

"The process in each case was as follows:—The pressure of the egg against the cuckoo's side, as I have said, was a constant irritation; but the irritability varied in degree in different parts of the body. On the under parts it scarcely existed; its seat was chiefly on the upper surface, beginning at the sides and increasing towards the centre, and was greatest in the hollow of the back. When, in moving, the egg



got pushed up to the upper edge of his side, he would begin to fidget more and more, and this would cause it to move round, and so to increase the irritation by touching and pressing against other parts. When all the bird's efforts to get away from the object had only made matters worse, he would cease wriggling, and squat down lower and lower in the bottom of the nest, and the egg, forced up, would finally roll right into the cavity in his back—the most irritable part of all. Whenever this occurred, a sudden change that was like a fit would seize the bird; he would stiffen, rise in the nest, his flabby muscles made rigid, and stand erect, his back in a horizontal position, the head hanging down, the little naked wings held up over the back," and the work of ejection would recommence. When the egg had been finally ejected, the rapid growth of the two nestlings made the position of the cuckoo more and more intolerable. A fresh series of struggles began, but success did not come till the little curved beak of the robin came accidentally into contact with the centre of the cuckoo's hollow back. Instantly the latter pressed down into the nest "shrinking away as if hot needles had pricked him, as far as possible from the side where the robin was lying against him, and this movement of course brought the robin more and more over him, until he was thrown right upon the cuckoo's back. Instantly the rigid fit came on, and up rose the cuckoo, as if the robin weighed no more than a feather on him; and away backward he went, right up the nest, without a pause, and standing actually on the rim, jerked his body, causing the robin to fall off clean away from the nest."

Mr. Hudson's account makes it appear that the young cuckoo's extreme sensitiveness to pressure upon its sides and upper parts is what causes it to perform the act of ejection. Its first desire is to remove its sides from the source of irritation; it wriggles with discomfort, and finally seeks escape by flattening itself down in the bottom of the nest. The effect, however, of this movement, is to throw the egg or nestling onto or across its back, and into contact with the most sensitive spot of all, the hollow in its back. It shrinks



from the contact as if, to use Mr. Hudson's expression, pricked by hot needles, only by so doing to make matters worse. So unendurable does the irritation become, that it galvanises the cuckoo into a convulsive almost supernatural energy, which gives it the strength required to expel the cause of its suffering.

It will be observed that, according to this account, the egg or nestling reaches the back as the purely mechanical result of the cuckoo's efforts to escape. According to most accounts there is a deliberate effort made to get the object into place (p. 475). The difference is probably one of interpretation, Jenner and others seeing in the preliminary arm and body movements of the cuckoo a meaning that they may not possess.

That the nestling cuckoo should be more or less sensitive to pressure is no doubt to be explained by the fact that it is in a nest about half the size of that which its parents would have built. That the irritability should be most acute in the hollow of the back may be explained by natural selection. Any nestling cuckoo that chanced to be born with physical modifications tending to increase the sensitiveness of the dorsal nerves would profit in the struggle for existence by the fact that, more than its fellows, it would be stimulated to greater energy in its efforts at ejection, and would, therefore, have a better chance of gaining undivided possession of the nest, and hence undivided attention from its foster-parents.

The sensitiveness of the depression in the back does not appear to arise from the existence of the depression itself. If it did, one would expect that the dates of the appearance and disappearance of the depression would correspond with the beginning and end of the period during which the nestling cuckoo showed signs of uneasiness at the presence of objects in the nest. The evidence on the point is scanty, but, as far as it goes, does not point to any definite correspondence.

With respect to the first appearance of the depression, Mr. J. H. Gurney notes that, in the case of one young cuckoo he observed, it



occurred about thirty-two hours after birth. The depression was then only just perceptible. The nestlings of the foster-parent were already evicted, being found dead on the edge of the nest. The depression was no longer perceptible when the cuckoo was four days and four hours old. Its desire to eject ceased at the age of three days ten hours.<sup>1</sup> According to Jenner, the cavity disappears about the twelfth day, and the desire to evict "begins to decline from the time the bird is two or three till it is about twelve days old, when, as far as I have hitherto seen, it ceases. Indeed, the disposition for throwing out the eggs appears to cease a few days sooner; for I have frequently seen the young cuckoo, after it had been hatched nine or ten days, remove a nestling that had been placed in the nest with it, when it suffered an egg put there at the same time to remain unmolested."<sup>2</sup>

One of the most remarkable features in the performance of the infant cuckoo is the contrast between its normal state of flabby helplessness and its sudden transformation into one of demoniacal energy. It has been compared by Mr. Hudson to the changes in a person suffering from epilepsy—"the sudden rigidity of muscle in some weak, sickly, flabby-looking person, the powerful grip of the hand, the strength in struggling exceeding that of a man in perfect health; and finally, when this state is over, the weakness of complete exhaustion"—a weakness which the young cuckoo also experiences. The apparent helplessness of the young cuckoo has led some observers to conclude that it is quite incapable of performing the act of ejection before it is two or three days old, and they hold that eggs or nestlings found ejected during the first two days, as is often the case, must be removed by the parent cuckoo.<sup>3</sup> The latter has not been seen to do this, unless we accept as good evidence that of the gardener given in the *Zoologist* (1889, 261), who stated that he saw a cuckoo remove three nestling hedge-sparrows, one by one, from a nest, and fly off with them. To

<sup>1</sup> *Zoologist*, 1905, 164.

<sup>2</sup> *Op. cit.*, p. 226.

<sup>3</sup> J. A. Link, *op. cit.*, pp. 171, 176-77; *Zoologist*, 1873, 3473 (C. A. Smith, who quotes Dybowski, *Journal für Ornithologie*, 1871, 393); *Mem. Soc. Zool. France*, 1895 (X. Raspail); J. H. Gurney, *Economy of the Cuckoo*; *Science Gossip*, 1868, May 1.



this may be added the statement of the gardener, quoted by Mr. H. H. Godwin Austen, that on one occasion he found three young wag-tails, two of them dead, and one egg, lying outside a nest in a greenhouse, the young cuckoo being at the time scarcely out of its shell. As an adult cuckoo had been seen on more than one occasion to enter the greenhouse, it was assumed to have made the eviction. Another example is provided by Herr Adolf Walter. He found a wren's nest containing a cuckoo just born, and, on the ground, four wren's eggs. The eggs were put back, and were not ejected while Herr Walter remained in observation. Next day the eggs were again found outside, and were put back, with the same result. In the afternoon, however, they were found once more ejected. They were put back a third time, and were not ejected. At the end of eight days they were still in the nest. On the strength of this by no means conclusive evidence, M. X. Raspail, in quoting it, goes so far as to make the following somewhat premature assertion: "Thus disappears from ornithological biology this legend which represents the young cuckoo as the murderer of his fellow-nestlings."<sup>1</sup>

A further argument in favour of the view that those ejections which take place before the young cuckoo is two days old are performed by the parent cuckoo is supplied by the following facts quoted by Herr Link. A brood of young robins and a young cuckoo were born on the same day. The former were found lying outside the nest all alive. They were replaced. Next morning they had completely disappeared, the young cuckoo being still in the nest. As the latter could not have carried its victims away out of sight, the inference made is that they were removed by the parent cuckoo, if not by the parent robin.<sup>2</sup> This overlooks the possibility of their having been ejected by the young cuckoo, and the bodies subsequently carried away by mice or rats.

A more cogent argument is supplied by the fact that when nestlings or eggs are found lying outside the nest and put back, it sometimes happens that no attempt is made to re-evict them by young

<sup>1</sup> *Mémoires de la Société Zoologique de France*, 1895, 162.

<sup>2</sup> Link, *op. cit.*, pp. 176-77.



cuckoos until they reach a certain age. A good example is provided by Mr. J. H. Gurney. On June 3, at 12.30 P.M., a young cuckoo, thirty-two hours old, was found alone in the nest, its fellow-nestlings, two young hedge-sparrows, lying dead on the rim. One was put back, but no attempt was made to eject it, though the young cuckoo showed signs of restlessness. On June 4, at 7.45 A.M., a pied-wagtail's egg was put in the nest with the same result, and some minutes later a nestling was substituted for the egg, but the cuckoo still made no serious effort. At 2 P.M. "a lively young wren" was put in, against which the cuckoo "immediately commenced proceedings," but failed to hoist it even on to the rim. It failed twice on the following day, its last attempt being made at the age of three days ten hours, after which its desire to evict ceased.<sup>1</sup> It might from this be inferred that the hedge-sparrows found outside the nest on June 3 were not ejected by the young cuckoo, but here again the inference amounts to no more than a supposition. The fact remains that there is as yet no convincing evidence that the parent cuckoo has been seen to perform the act of eviction, and with anything short of such evidence we have no right to be satisfied.<sup>2</sup>

There is good evidence, on the other hand, that the infant cuckoo can eject eggs and nestlings before it is two days old. The first ejection witnessed by Jenner took place within twenty-four hours of the birth of the cuckoo. He found the nest, on June 18, with three hedge-sparrow's eggs and one cuckoo's. The next day all were hatched, and the three hedge-sparrows ejected. The ejection of the third was witnessed by Jenner.<sup>3</sup> He also states that he saw one nestling cuckoo make its first attempt to eject another nestling cuckoo "a few hours after birth one morning."<sup>4</sup> It did not succeed in effecting its purpose till the following afternoon, but still within the two days' limit. The ejections above described, witnessed by Mr. Hudson, took place, either within or not much after forty-eight hours. This evidence is

<sup>1</sup> *Zoologist*, 1905, 164.

<sup>2</sup> *Op. cit.*, p. 225.

<sup>3</sup> *Zoologist*, 1899, 135, for a statement by another.

<sup>4</sup> *Op. cit.*, p. 238.



good as far as it goes, though it lacks precision owing to the neglect to state the time of day at which the birth of the cuckoo and the first attempt to eject respectively took place. More evidence is needed. If it does eventually prove beyond all question that the nestling can perform the act of eviction shortly after birth, the interest of the problem raised by the contrast, already alluded to, namely, between the creature's apparent feebleness and its sudden accession of extraordinary vigour, will be very greatly increased. That, at the age of two days, it should be able to throw out what to it must be a very heavy weight, is astonishing enough; that it should do so a few hours after birth would border on the miraculous.

What part does the foster-parent play in the act which has so tragic a termination for its own offspring? Information on this point, again, is scanty, attention having been chiefly directed to the proceedings of the young cuckoo, but what there is points to an attitude of complete indifference. In the account given by Mr. Hancock of the ejection of a young hedge-sparrow, it is stated that "the mother was present, but took no notice of the affair going on, and looked on calmly." The same mother-bird was observed to brood the young cuckoo shortly after the eviction of one of her eggs. She "remained a very short time on the nest and seemed very uneasy, raising herself and standing in the nest." Her uneasiness was no doubt due to the movements of the nestling cuckoo. The foster-parent sometimes has beneath her eyes the dead or dying bodies of her own nestlings. This was the case with the robin in the incident related by Mr. Hudson. She sat for hours warming the destroyer of her brood, while but a few inches away, on a broad green leaf, fronting her gaze, lay one of her evicted infants, "growing colder by degrees, hour by hour, motionless except when it lifted its head as if to receive food, then dropped it again, and when, at intervals, it twitched its body as if trying to move."<sup>1</sup> It seems that if her nestlings are not where the mother expects them to be—in the nest—then for her they

<sup>1</sup> *Hampshire Days*, p. 24.



cease to exist. I have myself, as related above in connection with the young rook,<sup>1</sup> placed a callow willow-wren on the ground an inch or two from the entrance of its nest, and though it wriggled there uncomfortably and conspicuously, the parent bird passed again and again over its head carrying food to the other nestlings without paying it the least attention. Birds, like men, are very much creatures of custom.

## IV

The young cuckoo remains in the nest about twenty days.<sup>2</sup> When hatched it has no down; its naked, creased and wrinkled skin is a pale flesh colour,<sup>3</sup> which later grows darker, becoming a slaty brown, "in fact nearly black."<sup>4</sup> On the seventh day the bird is nearly covered with sprouting quills, and its eyes are opening.<sup>5</sup> On the fourteenth it is well covered with bristly, growing feathers. Now and later, it appears, when disturbed, a truly startling object; it swells up in the nest, snapping and uttering quick, vicious little notes, its plumage all erect, its throat puffed out, and its angry eyes deep-set in bristling feathers, giving it an air of resolute ferocity that is almost terrifying. One that I placed on the ground to photograph behaved in exactly the same way, rising on its feet and making little angry springs and snaps at my finger. I noted that the inside of its capacious mouth was a bright red, in this resembling its parents. At what date the mouth assumes the red is not recorded; on the first day after hatching it is "pale yellow without any spots on the palate."<sup>6</sup>

The note of the young cuckoo was described by Jenner as a "chuckling noise like a young hawk's." It has been syllabled as *chiz*, *chiz*,<sup>7</sup> and *tz*, *tz*, *tz*, *tz*!<sup>8</sup> but whether its call-note for food and its note of anger are the same is not clear. The former has been

<sup>1</sup> Vol. i. p. 46.

<sup>2</sup> *Mémoires Soc. Zool. France*, 1895, 151 (X. Raspail); Wustnei and Clodius, *Vögel Mecklenburgs*; *Zoologist*, 1905, 164 (J. H. Gurney); *British Birds*, i. 303 (P. H. Bahr).

<sup>3</sup> *Zoologist*, 1889, 33-46 (A. Walter).

<sup>4</sup> *Zoologist*, 1905, 164 (J. H. Gurney).

<sup>5</sup> J. H. Gurney, *loc. cit.*

<sup>6</sup> J. H. Gurney, *op. cit.*

<sup>7</sup> Coward, *Fauna of Cheshire*, i. 268.

<sup>8</sup> *Field*, 1898, 358.



compared to the "twisting of a glass stopper in a bottle."<sup>1</sup> According to Mr. Coward, the young cuckoo, at least when it has quitted the nest, is not affected by the alarm-notes of the foster-parents.<sup>2</sup>

Both before and after quitting the nest the little cuckoo is fed assiduously by its foster-parents, for which it is not always sufficiently grateful. One was seen, after receiving its food, invariably to make a vicious snap at the giver, a pipit, which the latter managed to avoid on each occasion by prompt retreat.<sup>3</sup> When out of the nest, one of the foster-parents may not uncommonly be seen perched on the cuckoo's back, a convenient perch from which it is able to drop its contribution into the upturned, wide-open, red blazing gape of its gigantic charge.<sup>4</sup> How long the young cuckoo continues to be fed after quitting the nest has not been exactly recorded.

The food given to the young cuckoo varies, of course, with the species of the foster-parent. One fed by wagtails received flies, beetles, small snails, grasshoppers, caterpillars, part of a horse bean, and vegetable substance resembling bits of tough grass, which was found inside it rolled into a ball; also seeds of a vegetable resembling those of the goose-grass. Another was nourished by a tit-lark, chiefly with grasshoppers; a third by a hedge-sparrow, almost entirely with vegetable food, wheat, vetches, etc., an exceptional diet, as, according to Jenner, from whom these details are taken, hedge-sparrows usually feed young cuckoos on animal food. Snails and large worms formed the diet provided by a tit-lark observed by Weir.

It would be interesting to know whether the diet of the young cuckoo influences its adult gastronomic tastes, thus causing considerable variations in the food of individual birds. The only variation of which we have at present any certainty is that caused by the varying nature of the cuckoo's habitat. Baron Droste-Hülshoff relates, for instance, that the cuckoos which bred among the sand-hills of the island of Borkum off the mouth of the Ems, had to deny

<sup>1</sup> *British Birds*, i. 363 (P. H. Bahr).

<sup>2</sup> *Loc. cit.*

<sup>3</sup> Coward, *loc. cit.*

<sup>4</sup> For photographs of this see *British Birds*, i. 366 (P. H. Bahr); and R. Keartons' *Nature's Carol Singers*, p. 14.



themselves the favourite food of their species, hairy caterpillars, for these were scarcely to be found.<sup>1</sup> As the species finds its food largely in tall trees, the diet of individuals must again vary somewhat with the kind of tree they haunt.

The full dietary of the cuckoo is given in the "Classified Notes." The most interesting item in it are the hairy caterpillars above referred to. These are refused by the vast majority of birds, among the exceptions being the mistle-thrush.<sup>2</sup> The bird swallows the caterpillar, hairs and all. The hairs remain in the gizzard, when the digestible portions have been absorbed, and are there found either adhering to the surface of the gizzard so as to give it the appearance of being coated with fur, or else collected into a ball, ready no doubt for ejection. How long the hairs remain in the gizzard, and how they are detached previous to ejection, has not been ascertained. That they must sooner or later be ejected is obvious. If proof were needed, it is supplied by the fact that birds dissected on their arrival have the gizzard quite free from hairs.

Balls of hair are occasionally found in the stomachs of young cuckoos. Those found by Jenner were "curiously wound up," and were composed chiefly of horsehair. Owing to the presence of the same in the lining of nests, he inferred that the cuckoo had swallowed them while a nestling.<sup>3</sup>

The cuckoo occasionally picks its food off the ground, descending for that purpose, making a few ungainly hops, and then flying back into the tree. It will often cling to the trunk in order to pick off an insect, but, according to Naumann, always across it, and not vertically like the woodpeckers. Gilbert White relates that in July he saw "several cuckoos skimming over a large pond; and found, after some observation, that they were feeding on the *Libellulæ*, or dragon-flies, some of which they caught as they settled on the weeds, and some as they were on the wing."<sup>4</sup> The fact that this incident was witnessed

<sup>1</sup> *Vogelwelt der Nordseeinsel-Borkum*, 1869, 84.

<sup>3</sup> *Op. cit.*, pp. 235-36.

<sup>2</sup> E. L. Turner (*in litt.*).

<sup>4</sup> Letter to Barrington, October 8, 1770.



in July seems to point to a gathering of cuckoos previous to, or on, migration. The species has been seen to migrate in flocks, also singly.<sup>1</sup> The adults depart for the most part early in July; the young follow some weeks later, and have consequently to find their way to their African winter quarters under the guidance of their instinct only, knowing nothing of the new wonderland where, for the first time, perhaps, they will meet others of their kind, and among them, it may be, the parents they have not yet seen and do not recognise.

## THE CUCKOO'S FOSTER-PARENTS AND EGGS

[F. C. R. JOURDAIN]

Various lists have been prepared at different times of the different foster-parents made use of by the cuckoo, but for the purposes of this paper we may ignore the earlier ones, which were necessarily based on imperfect data,<sup>2</sup> and consider only the later and fuller ones. In 1883 Mr. E. Bidwell published a list of 86 foster-parents, with indications of the origin of most of the records, in the *Trans. Norfolk and Norwich Nat. Hist. Soc.*, iii. p. 526.<sup>3</sup> In 1892, in his *Altes und Neues aus dem Haushalte des Kuckucks*, the late Dr. E. Rey gave on pp. 18-20 a list of 117 foster-parents. Of these some 18 were from India or Siberia, and in those cases where the records were unique or exceedingly rare, references are given to the name of the author to whom they are due, while an attempt is made to classify the occurrences geographically. In 1896 Mr. E. Bidwell organised an exhibition of cuckoos' eggs in London, at which 919 were shown, and in the *Ibis* of that year (pp. 397-400) he published a list of Western Palæarctic birds in the nests of which cuckoos' eggs have been found. This list contains the names of 119 species, with the number of eggs of each species exhibited

<sup>1</sup> See "Classified Notes."

<sup>2</sup> Some particulars of earlier lists may be gleaned from W. Wells Bladen's list of references in the *Annual Rep. and Trans. of the N. Staffs. Naturalists Field Club*, 1895-96, p. 30.

<sup>3</sup> Of these 42 were marked as having occurred in Great Britain.



noted, but no information as to the source from which the records were derived. In the same year Mr. W. Wells Bladen published, in the *Annual Report and Transactions of the N. Staffordshire Field Club*, vol. xxx. pp. 30-39, a list of 145 species, of which 122 were European. By means of initials in parallel columns Mr. Bladen shows which species have been included in the more important published lists, and also notes which species are represented in his own collection, with localities. In Naumann's *Naturgeschichte der Vögel Mitteleuropas*, iv. p. 403, Dr. Rey gives an amended list of 145 species, which is practically identical with Mr. W. Wells Bladen's, and a few years later, in his *Eier der Vögel Mitteleuropas*, pp. 94-96, he published a catalogue of 146 foster-parents, of which 119 were classed as European and 27 as Asiatic. At the present time it is probable that the list of Asiatic foster-parents might be largely increased, but the question arises whether these long lists of names, in many cases based only upon clutches bought from dealers, without even the original collectors' names, have any real scientific value. The fictitious value attached to a cuckoo's egg with a clutch of some rare foster-parent makes deception so easy and profitable, that a thorough investigation of records is desirable, and it would be better if only those authenticated by the testimony of the finder were admitted.

In Rey's list of 117 species, an analysis of the records shows that no fewer than 94 are recorded fewer than ten times, leaving only some 23 regular foster-parents. Of course this list is very imperfect, especially with regard to English records, but it probably represents with some accuracy the proportion of rare or accidental foster-parents as opposed to regular ones in Germany. The highest number of records (199 instances) is associated with the redbacked-shrike, *Lanius collurio* L., but its position at the head of the list is due to exceptional circumstances. The majority of Rey's records were naturally derived from his own collection, and in the Leipzig district the redbacked-shrike was an exceptionally favoured foster-parent. Thus out of 147 cuckoos' eggs from this neighbourhood, no fewer than



127 were obtained from nests of *L. collurio*. In other parts of Germany this proportion is reversed. Thus out of 119 eggs from Dessau, only 10 were obtained from nests of this species. Next in order comes the white-wagtail, *Motacilla alba alba* L., with 165 records, followed by the garden-warbler with 103, the reed-warbler with 86, the common wren with 82, the redstart with 76, the robin with 72, the common whitethroat with 49, and the barred-warbler with 38. Other species which have been recorded more than ten times are the tree-pipit (31), the sedge-warbler and hedge-sparrow (25), the marsh-warbler (24), the blackcap (21), the meadow-pipit (18), the chiff-chaff (16), the pied-wagtail (16), the linnet and wood-warbler (15), the yellow-bunting (14), the lesser-whitethroat (13), the great reed-warbler (11), and the blue-headed-wagtail (10).

At the present time no materials are available for a similar study of English records, but it is quite clear that if a list were drawn up on similar lines there would be considerable discrepancies. Thus the redbacked-shrike would be relegated to the list of rarer fosterers, the pied- and yellow-wagtails would replace the white- and blue-headed forms, the barred-warbler would disappear from the list altogether, and the marsh-warbler would be classed among the rarest foster-parents. On the other hand the hedge-sparrow, meadow-pipit, and yellow-bunting would probably take much higher positions in the list. At Mr. Bidwell's exhibition, where the great majority of exhibited specimens were of British origin, some idea may be gathered of the preponderance of certain fosterers from the number of nests exhibited. Thus the hedge-sparrow supplied 74 instances, the robin 65, the reed-warbler 62, the meadow-pipit 49, the garden-warbler 47, and the sedge-warbler 41. Among the rarer foster-parents which have been found with cuckoo's eggs in the British Isles, the following deserve special treatment:<sup>1</sup>—

<sup>1</sup> It has not been thought necessary to give records in the case of the commonly adopted fosterers mentioned above, nor in those of the linnet, yellow-bunting, tree-pipit, whitethroat, willow-warbler, garden-warbler or wren, all of which have been frequently recorded.



[Records of young cuckoos are marked thus (†).]

Greenfinch. Recorded by G. D. Rowley;<sup>1</sup> W. Borrer; A. Hussey (*Zoologist*, 1860, p. 7104); J. E. Harting; F. Bond; S. Lewis; F. C. R. Jourdain; J. G. Tuck, and others.

Hawfinch. Recorded by J. Palmer (*Zoologist*, 1902, p. 279).

House-sparrow. Professor A. Newton (1842) (*Ootheca Wolleyana*, i. p. 202); H. E. Smith (*Cat. Eggs Br. Mus.*, iii. p. 113); J. Tomlinson (*Field*, 1861, xviii. p. 67 †); T. N. Postlethwaite (*Naturalist*, 1885, p. 127); M. C. H. Bird (quoted by J. H. Gurney).

Tree-sparrow. T. N. Postlethwaite (*loc. cit.*).

Chaffinch. W. Borrer; H. A. Macpherson (quoting Cairns) (*Birds of Cumberland*, p. 67 †); S. Lewis (*Zoologist*, 1906, p. 34); L. B. Mouritz (*Avicultural Magazine*, 1907, p. 359).

Lesser-redpoll. F. W. Paple (quoted by W. W. Bladen, p. 36); H. Noble (*British Birds*, i. p. 313).

Twite. T. C. Heysham (*Vert. Fauna of Lakeland*, p. 170); W. Greenup (*Birds of Cumberland*, p. 67); cf. *Trans. Cumberland Association*, pt. ii. (1876-77) p. 172, quoted by Bidwell; E. P. Butterfield (*Zoologist*, 1904, p. 315 (but not the records referred to on p. 314)); H. B. Booth (*Zoologist*, 1905, p. 433); cf. also *Zoologist*, 1906, p. 111.

Bullfinch. A. W. Johnson (*in litt.*); S. Lewis (*Zoologist*, 1906, p. 33); cf. *Zool.*, 1905, p. 433; J. H. Owen (*in litt.* †).

Corn-bunting. R. J. Ussher;<sup>2</sup> C. E. Radcliffe (*Cat. Eggs Br. Mus.*, iii. p. 113); J. Palmer (*Caradoc and Severn Valley Field Club Report*, 1902, 1903).

Girl-bunting. H. Saunders (quoted by Bidwell); C. B. Wharton (*Zoologist*, 1882, p. 265).

Reed-bunting. J. E. Harting; J. G. Tuck; R. J. Ussher; H. A. Macpherson (*Birds of Cumberland*, p. 67); F. Barclay (*Zoologist*, 1907, p. 129 †); F. C. R. Jourdain, etc.

Skylark. E. V. Seebohm (*Cat. Eggs Br. Mus.*, iii. p. 112); F. Bond; J. E. Harting; J. Palmer; M. A. Mathew, and others.

Woodlark. F. Bond; cf. also *Zoologist*, 1863, p. 8992 †.

White-wagtail. See J. Palmer (*Caradoc and Severn Valley Field Club Report*, 1904, p. 31; 1905, p. 27).

<sup>1</sup> G. D. Rowley's list of foster-parents will be found in the *Ibis*, 1865, p. 178-186; F. Bond's and J. E. Harting's lists were published in the *Birds of Middlesex*, p. 120.

<sup>2</sup> *Birds of Ireland*, p. 113.



- Grey-wagtail. F. Bond; J. S. Elliott (*Zoologist*, 1892, p. 332 †; and *Caradoc and Severn Valley Field Club Report*, 1900); J. Palmer (*tom. cit.*, 1904, 1905).
- Yellow-wagtail. F. Bond, J. E. Harting, Professor A. Newton, J. F. Brockholes, F. C. R. Jourdain, and others.
- Rock-pipit. Cf. *Field*, 1865, xxvi. p. 43. F. Bond; C. E. Seaman (*Zoologist*, 1863, p. 8720 †); C. Oldham (*Zoologist*, 1896, p. 260); T. H. Nelson (*Birds of Yorkshire*, i. p. 135).
- Song-thrush. G. T. Porritt (quoted by Bidwell); A. G. Butler (*Zoologist*, 1877, p. 300 †); J. H. Willmore (*Zoologist*, 1883, p. 303); J. G. Tuck (*Zoologist*, 1897, p. 364); R. H. Read (*Zoologist*, 1900, p. 520); Rev. C. Birley (*Field*, July 6, 1901); J. Palmer (*Caradoc and Severn Valley Field Club Report*, 1900, 1901); A. B. Farn, 1904 (*Birds of Kent*, p. 247); L. B. Mouritz (*Avic. Mag.*, 1907, p. 358).
- Blackbird. E. Bidwell (*Zoologist* 1877, p. 340); *Field*, May 22, 1897; F. C. R. Jourdain; Rev. C. F. Thornehill (*British Birds*, iii. p. 28, and *Caradoc and Severn Valley Field Club Report* for 1909); W. A. Wilkinson (*tom. cit.*, 1903).
- Ring-ouzel. R. Small and A. Hogg (quoted by Bidwell); W. Wells Bladen (*Rep. N. Staffs. Field Club*, 1895-96, p. 24).
- Wheatear. J. E. Harting; Rev. W. K. Martin (*in litt.*); Coward and Oldham (*Vert. Fauna of Cheshire*, i. p. 270).
- Whinchat. J. Harrison (quoted by Bidwell); cf. *Birds of Lancashire*, 2nd ed., p. 113; *Vert. Fauna of Lakeland*, p. 170.
- Stonechat. W. M. Crowfoot (quoted by Bidwell); Major Dods (*Zoologist*, 1905, p. 88 †).
- Redstart. J. Whatt (*Zoologist*, 1863, p. 8328 †); J. E. Harting; F. Bond; O. V. Aplin (*Zoologist*, 1900, p. 13 †).
- Nightingale. F. Bond, J. E. Harting; J. G. Tuck (*Zoologist*, 1899, p. 323); L. B. Mouritz (*Avic. Mag.*, 1907, p. 359).
- Dartford-warbler. F. Bond; P. Crowley; cf. *Zoologist*, 1901, p. 251.
- Goldcrest. H. S. Davenport (*Field*, June 3, 1911 †).
- Chiff-chaff. H. E. Rawson (quoted by Bidwell); J. Palmer (*Caradoc and Severn Valley Field Club Report*, 1905).
- Wood-warbler. C. Stubbs (*Zoologist*, 1863, p. 8681); J. Palmer (*Caradoc and Severn Valley Field Club Report*, 1901, 1906).
- Blackcap. F. Bond; J. G. Tuck; G. W. Kerr (*Zoologist*, 1906, p. 308); and others.
- Marsh-warbler. W. W. Fowler (*Zoologist*, 1898, p. 356, 1900, p. 20, 1906,



- p. 403); P. F. Bunyard (*British Birds*, iii. p. 185); G. W. Kerr and E. Pettitt (*Zoologist*, 1909, pp. 397-8); W. Farren (*British Birds*, iv. p. 37).
- Grasshopper-warbler. F. Bond; F. W. Lambert (*Zoologist*, 1892, p. 246).
- Great-tit. P. F. Bunyard (*Bulletin B. O. C.*, xxvii. p. 40).
- Redbacked-shrike. F. Bond; C. E. Wright (*in litt.*); J. G. Tuck (*Zoologist*, 1899, p. 323); cf. *tom cit.*, 1901, p. 251; J. Palmer (*Caradoc and Severn Valley Field Club Report*, 1906).
- Spotted-flycatcher. F. Bond; J. G. Tuck; C. E. Wright (*in litt.*), and others. Cf. J. H. Gurney (*Zoologist*, 1898, p. 111 (2 † reared)).
- Swallow. H. Nicholls (*Zoologist*, 1869, p. 1866 †); G. Rooper (*tom. cit.*, 1877, p. 260); *Field*, March 22, 1890, p. 432; C. Wolley Dod (*Ibis*, 1892, pp. 524-530 †); E. W. Atkinson (*Field*, Aug. 11, 1894, cf. *Zoologist*, 1894, p. 340 †).
- Ring-dove. Willughby.
- Pheasant. W. Wells Bladen (*Rep. and Trans. N. Staffs. Field Club*, 1895-96, p. 24).
- Red-grouse. *Dumfries Courier*, July 1, 1844 (quoted by H. S. Gladstone, *Birds of Dumfries*, p. 169).
- Kestrel. J. Shaw (quoted by H. S. Gladstone, *loc. cit.*).

(The four latter species can hardly be regarded seriously as foster-parents, and in each case the cuckoo had probably failed to find any suitable nest in which to deposit her egg.<sup>1</sup>)

Although it has long been known that a considerable amount of variation exists in cuckoos' eggs, the curious fact remains that in a series of British taken eggs, the variation is considerably less than in a similar series taken on the Continent. At the time of the first publication of Dr. Baldamus' work on the eggs of the cuckoo, in which it was stated that the eggs of the cuckoo tend to mimic those of the foster-parent, this statement was met with much incredulity on the part of some English naturalists, and led to a long controversy in the columns of the *Zoologist*. A fuller knowledge of the range of variation in this species has proved that mimicry does exist in a large proportion of cases, especially on the Continent; but side by side with such

<sup>1</sup> The same remark applies to the jay, green-woodpecker, stock-dove, turtle-dove, and little-grebe, all of which have been recorded as foster-parents on the Continent.



eggs other instances occur in which there is no resemblance whatever between the egg of the cuckoo and that of the foster-parent. The plate of cuckoos' eggs has been specially arranged to bring out some of these anomalies. Figs. 1, 3, and 6, in which cuckoos' eggs are represented with one egg of the fosterer from the same nest, show remarkable contrasts in colour and general appearance. This is also observable in Figs. 13, 16, 17, 21, 27, and 30, all of which differ widely from typical eggs of the foster-parent.

On the other hand, Figs. 2, 4, 5, 10, and 11, each of which is figured together with a fosterer's egg, show remarkable mimicry, and it is apparent also in Figs. 15, 19, 22, 24, as well as to some extent in some of the other illustrations. It will be noticed that out of the 30 cuckoos' eggs figured, 27 are of British origin, while 3 are from various parts of the Continent. The first of these (Fig. 11) is the historic blue egg obtained by Seebohm in North Brabant in a redstart's nest, from which he extracted the embryo and noticed its zygodactyle feet, thus proving that it was not an unusually large redstart's egg, as had been suggested by some of the more incredulous English collectors.<sup>1</sup> Although there is some evidence that this blue type of egg occasionally occurs with us, there appear to be no thoroughly authenticated specimens in existence to prove the fact; while in some parts of the Continent, such as Finland, it is not very rare, and is always found in the nests of birds which themselves lay blue eggs. This is the more remarkable in view of the fact that the hedge-sparrow is very frequently adopted as a foster-parent in England. Figs. 15 and 22, representing eggs taken from a robin's and a redbacked-shrike's nest respectively, are also noticeable as exhibiting mimicry in the opposite direction—red predominating instead of blue.

An examination of a large series of British taken eggs leads to the following conclusions. In some species (of which the hedge-sparrow, wren, and willow-warbler are perhaps extreme cases) there is practically no attempt at mimicry. In others (of which we may

<sup>1</sup> Cf. *Ibis*, 1895, p. 180.



take the pied-wagtail as typical) there is almost invariably a great resemblance between the eggs of the cuckoo and the fosterer. There is also a third class in which resemblance undoubtedly exists in some cases, while in others it is equally certainly lacking. The tree-pipit and robin may be quoted as belonging to this category. On the Continent, eggs of the cuckoo found in nests of the redstart and brambling almost invariably resemble those of the fosterer very closely. Dr. Rey states that out of 67 cuckoos' eggs taken from redstarts' nests, no fewer than 57 were blue, and, except in size, did not differ from those of the redstart, while the few examples obtained from bramblings' nests in all cases showed close mimicry. Other species in which mimicry commonly exists are the common white-throat, the garden-warbler, the reed-warbler, and the sedge-warbler; while, on the other hand, no authenticated instance of mimicry has been recorded in the case of the common wren, willow-wren and its congeners, and only very rarely in the case of the hedge-sparrow.<sup>1</sup> On the whole, it may confidently be stated that successful mimicry exists only in a minority of cases, and is less prevalent in the British Isles than on the Continent, while in India some wonderful types of erythristic eggs have been obtained which are unknown in Europe.

One other point about the egg of the cuckoo deserves a word of mention. Not only is there considerable range of colouring in these eggs, but the size is also variable, and in certain cases the egg of the cuckoo bears some relation to the size of the eggs of its host. Thus Mr. R. H. Read informs me that the largest cuckoo's egg he ever found was in the nest of the largest host, a song-thrush, while the smallest was with the smallest eggs of any represented host, namely the sedge-warbler. Mr. O. H. Latter has investigated the subject from a mathematical standpoint in *Biometrika*, i. pt. ii. pp. 164-76, and iv. pp. 363-73, and comes to the conclusion that eggs found in nests of hedge-sparrow, tree-pipit, meadow-pipit, and robin vary

<sup>1</sup> Cf. N. F. Ticehurst, *Birds of Kent*, p. 247; W. Borrer, *Birds of Sussex*, p. 167; S. Lewis, *Zoologist*, 1906, p. 34.



## Egg Plate E

### Eggs of Cuckoo, *Cuculus canorus*

By H. Grönvold

Figs. 1 to 12, Eggs of Cuckoo together with those of foster parents:—

- 1, + Hedge-sparrow (Leatherhead, Brit. Mus.). 2, + Sedge-warbler (England, Brit. Mus.). 3, + Wren (Northampton, F. Jourdain coll.). 4, + Pied-wagtail (Berks, Brit. Mus.). 5, + Pied-wagtail (Tenby, Brit. Mus.). 6, + Reed-warbler (Arlington, Surrey, Brit. Mus.). 7, + Tree-pipit (Salop, Brit. Mus.). 8, + Meadow-pipit (Hayes Common, Brit. Mus.). 9, + Tree-pipit (Odiham, Hants, Brit. Mus.). 10, + Greenfinch (Suffolk, F. Jourdain coll.). 11, + Redstart (Valkenswaard, Holland, Brit. Mus.). 12, + Blackbird (Staffordshire, F. Jourdain coll.).

Figs. 13 to 30 represent eggs of Cuckoo alone:—

- 13 (+ Nightingale, Surrey, Brit. Mus.). 14 (+ Robin, Churt, Brit. Mus.). 15 (+ Robin, Moravia, Brit. Mus.). 16 (+ Robin, England, Brit. Mus.). 17 (+ Chiffchaff, Churt, Brit. Mus.). 18 (+ Reed-warbler, Arlington, Brit. Mus.). 19 (+ Grasshopper-warbler, Brighton, Brit. Mus.). 20 (+ Hedge-sparrow, S. Cadbury, Somerset, R. H. Read coll.). 21 (+ Reed-bunting, England, Brit. Mus.). 22 (+ Redbacked-shrike, Moravia, Brit. Mus.). 23 (+ Whitethroat, Epping, Brit. Mus.). 24 (+ Reed-warbler, Holkham, Brit. Mus.). 25 (+ Dartford-warbler, Churt, Brit. Mus.). 26 (+ Linnet, Churt, Brit. Mus.). 27 (+ Whinchat, Otterbourne, Brit. Mus.). 28 (+ Spotted-flycatcher, Salop, Brit. Mus.). 29 (+ Skylark, Salop, Brit. Mus.). 30 (+ Stonechat, Twyford, Brit. Mus.).









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in size relatively to that of the foster-parents' eggs. Thus while robins' eggs average  $17.7 \times 12.7$  mm. and hedge-sparrows'  $20.1 \times 14.7$ , cuckoos' eggs from the former average  $21.1 \times 15.8$  and from the latter  $23.1 \times 16.8$ .

With regard to the question as to the number of eggs laid by each hen cuckoo in the course of the season, we find great discrepancies in the conclusions at which different writers have arrived. The tendency of most of the earlier writers on the subject was in favour of a small number of eggs, ranging from 4 or 5 to 7, laid at intervals of six to eight days. But Dr. Rey's researches led him to the astonishing conclusion that each female cuckoo laid about 20 eggs every year, and that they were deposited on alternate days. J. A. Link, on the other hand, believes that the long series of eggs of one type collected by Dr. Rey and his son in single seasons were probably the produce of two hens which laid very similar eggs. V. Čapek, in a very careful paper in the *Ornithologische Jahrbuch* for 1896, is of opinion that the cuckoo lays on alternate days, but that the eggs are deposited at two periods, with an interval between, as in the case of birds which are ordinarily double brooded. He believes that a hen in full vigour lays 5 to 7 eggs on alternate days during the first period, while, after a short pause, a second series of eggs, probably from 4 to 5 in number, is deposited, but at longer and probably irregular intervals. On the whole this seems to be the most satisfactory elucidation of the facts, and is not inconsistent with the facts as recorded both in England and on the Continent. It must be remembered that the accurate study of this subject can be carried on in some parts of the Continent far more satisfactorily than with us. Thus in the neighbourhood of Leipzig, where Dr. Rey worked, the redbacked-shrike is the most favoured foster-parent of the cuckoo. But the whole country round is arable, entirely devoid of hedgerows, and only here and there are small plantations to be found, where the shrikes must necessarily breed. It is therefore not impossible for two active men to be personally acquainted with every nest of the shrike for a wide radius.



Now in a well wooded district, with innumerable hedgerows, gardens, and coppices, it is quite impossible for the keenest bird-nester to be able to work every possible breeding-place. The best results have therefore naturally been obtained in England in the case of such species as the reed-warbler, which is confined to a limited area on the banks of our rivers, and, as far as they go, these observations tend to confirm Čapek's conclusions. Of course no definite results could have been arrived at if it were not for the fact, which may be regarded as definitely proved, that each hen cuckoo lays eggs of a similar type throughout her life. The marvellous series of eggs collected by the Reys, with the index number of each hen on the test-tube containing the clutch, would convince the most sceptical.

As a general rule it may be stated that each hen cuckoo lays by preference in the nest of some one species. When this species is plentiful it is probable that all the eggs are laid in this way. But if we suppose that a hen cuckoo is parasitic on the reed-warbler, and after successfully depositing four or five eggs she finds the supply of foster-parents exhausted, as the colony of reed-warblers is only a small one, it is natural that she should make use of a sedge-warbler's nest with fresh eggs in the same locality. This we know from experience does frequently take place, and in all probability many of the rarer foster-parents are only made use of owing to the fact that the cuckoo can find nothing really suitable for the purpose. I am inclined to think that in some cases they are merely intended as a temporary convenience, for cases have fallen within my own experience in which a cuckoo's egg has proved to be incubated for some days, while the eggs of the foster-parent were quite fresh.<sup>1</sup> Unless the cuckoo's egg had been left for a day or two in the nest of some other species, it is difficult to account for this, as it is hardly credible that a bird would brood over a cuckoo's egg for some days before she had begun to lay.

<sup>1</sup> Cf. also H. Reeks, *Zoologist*, 1863, p. 8681: J. G. Tuck, *Zoologist*, 1899, p. 323; 1901, p. 317.



Another rule of almost invariable application is that each cuckoo lays only a single egg in any one nest. It is true that one or two instances have recently been recorded on the Continent in which two eggs in one nest are ascribed by the finder to the same hen; but the very fact that these remain almost unique among the numerous records of two and even three eggs of the cuckoo having been found in the same nest, is quite enough to establish the truth of the general rule.<sup>1</sup> Instances in which the eggs of two hen cuckoos have been found in one nest are too numerous to be worthy of special record,<sup>2</sup> but those in which the districts of three hens have overlapped, and all three have laid in one nest, are naturally exceedingly rare. In the British Isles five instances appear to have been recorded. In the *Zoologist* for 1865, p. 9618, Mr. T. E. Gunn records a nest with two young cuckoos and an addled egg, as well as two young meadow-pipits. In the same journal for 1900, p. 368, R. Kelley writes that a friend of his found a titlark's nest with three cuckoo's eggs, presumably in North Devon. *Country Life* for June 16, 1906, contained a photograph of a hedge-sparrow's nest with three cuckoo's eggs as well as four of the rightful owner! (See Pl. XXXVI.) The Rev. J. G. Tuck records a meadow-pipit's nest with three cuckoo's eggs, but no others, in the *Zoologist* for 1906, p. 276; and lastly, Mr. J. F. Green gives particulars of a robin's nest from which three cuckoo's eggs were taken, but in this case one was removed before the other two were laid. In both these latter cases it is definitely stated that all three cuckoo's eggs belonged to different types. On the Continent several instances have also been recorded. The Hungarian National Museum contains a robin's nest with three cuckoo's eggs; Herr A. Walter found two wrens' nests, each containing three cuckoo's eggs (*Ornithologische Monatsschrift*, 1893, p. 463); but the earliest recorded instance appears to be that mentioned in the *Journal für Ornithologie* for 1874, p. 80,

<sup>1</sup> See C. Jex, *Zeitschrift für Oologie*, 1892-93, p. 38; V. Čapek, *Ornithologische Jahrbuch*, 1896, pp. 154-156.

<sup>2</sup> Thus Čapek (*Ornithologische Jahrbuch*, 1896, p. 153) records eleven instances in his collection; while the Rey collection in 1892 included twenty-one.



where it is stated that a nest of the white-wagtail was found with three cuckoo's eggs and two of the foster-parent in the Reitzenstein Forest near Landsberg, Germany. Most extraordinary of all is the statement of Herr Otmar Reiser (*Jahresbericht Com. für orn. Beobacht. Stationen*, 1884, p. 82), that a forester near Landskron in Bohemia discovered four fledged cuckoos together in a hole of a tree, which were being fed by redstarts! In this case the young were unable to leave the nest owing to the narrow entrance to the hole.



# THE PIGEONS

[ORDER: *Charadriiformes*. FAMILY: *Columbidæ*]

## PRELIMINARY CLASSIFIED NOTES

[F. C. R. JOURDAIN. W. P. PYCRAFT. A. L. THOMSON]

**WOOD-PIGEON** [*Columba palumbus* (Linnæus). Ring-dove, cushat, queest, woodie; cushie doo (Scotland). French, *colombe ramier*; German, *Ringeltaube*; Italian, *colombaccio*].

**1. Description.**—The wood-pigeon is readily distinguished from all its congeners, not only by its much larger size, but also by the large patch of white on the neck, and the broad band of white which runs across the extended wing transversely to its long axis. Length 16 in. [406·4 mm.]. The sexes are alike. (Pl. 89.) The head and neck are bluish grey glossed with metallic green and lilac; the side of the neck marked by a large patch of creamy white. The back and wings are of a bluish lead colour, the greater wing-coverts are blackish. Across the extended wing, from the region of the wrist joint, runs a broad white bar, transversely to the long axis of the extended wing; the anterior margin of the wrist joint is also white. The under parts from the throat to the breast are vinous, with the abdomen, flanks, and under tail-coverts pale bluish grey. The beak is orange-red at the base, yellow towards the tip, the cere white; the legs and toes are red, and the iris is straw-yellow. The female is somewhat smaller and duller than the male. The juvenile plumage differs from that of the adults in being duller and paler, tinged with brown, and lacking the white patch on the neck. The beak is dull red at the base, the rest greyish. The nestling is sparsely covered with yellowish, hair-like down. [W. P. P.]

**2. Distribution.**—During the breeding season this species is generally distributed through all the wooded portions of Europe (except in Scandinavia and Russia north of lat. 65°-66° N.), as well as in Asia Minor, while other subspecific



forms are found in the Azores, Madeira, and North-western Africa. In the British Isles it is a well-known resident in practically the whole of Great Britain and Ireland, except in treeless districts, but it has bred occasionally in small numbers even on the Outer Hebrides and the Orkneys. Birds from Northern Europe are migratory, and have their winter quarters in our islands and in Central and Southern Europe as well as North Africa, but the migration limits of this species appear to extend no farther than its most southerly breeding range. [F. C. R. J.]

**3. Migration.**—A resident, and a winter visitor in greatly varying numbers. There is no evidence of any movement on the part of our resident birds, but they may possibly migrate to some extent within our area, seeing that such movements might well be indistinguishable from the subsequent wanderings of Continental immigrants. The immigration referred to takes place on the east coast of Great Britain, the Shetland Isles being visited by some of the migrants. The extent of the immigration varies greatly from year to year, but at its maximum it affects the greater part of our area, the species' numbers in Ireland, for instance, then receiving large additions. As a rule, the birds first arrive in the British Isles late in October or early in November, and their numbers are increased during the latter month; by the end of January a decrease may already have set in, and the majority leave in February (cf. C. B. Ticehurst, *British Birds*, ii. p. 72; and others). What has been said of the immigrants in Ireland is true of our area as a whole, namely, that they "vary as to the localities they visit, the time they remain, and the seasons in which they occur, being doubtless influenced by the rigour of the weather in the countries whence they come, and also by the abundance of beechmast and other food here" (Ussher and Warren, *B. of Ireland*, 1900, p. 222). Seasons in which great immigrations have occurred are 1881, 1884 (especially: cf. *British Association Migration Reports*, vi. p. 59), 1889, 1894, 1899, 1901 (cf. Nelson, *B. of Yorks.*, 1907, p. 488), and 1907 (cf. C. B. Ticehurst, *loc. cit.*). A markedly gregarious bird on migration and in the winter months generally: in seasons such as those just named enormous flocks occur. [A. L. T.]

**4. Nest and Eggs.**—When built by the birds themselves, the nest is placed in tall hedges or trees of all kinds at varying heights, but generally at a fair distance above the ground, and is a flimsy erection of twigs, through which the eggs can often be seen. (Pl. XXXVIII.) But many nests are made upon old squirrel dreys or nests of other birds, and it is not uncommon to find it breeding in ivy, on trees, walls, or cliffs. It has also been known to build exceptionally on or quite close to the ground, in heather or bracken, under boughs, etc. (cf. H. F. Witherby, *Zoologist*,



1895, p. 232, and also p. 275; *Annals of Scottish Natural History*, 1901, p. 236), while in towns it has nested on a window ledge (see *Field*, 7th May 1904). Material for building is contributed by both sexes according to Naumann, but the work of construction is performed by the hen. The eggs are generally two only, but instances of three in a nest are occasionally recorded, while the rare instances in which four eggs have been found in a nest probably represent the first and second layings of one hen, or the produce of a second bird when the first has been killed (see *Zoologist*, 1889, p. 436; *British Birds*, iv. pp. 155 and 316). They are a pure white, with no trace of cream, and are decidedly glossy. Saunders states that they are laid at intervals of two or three days. Average size of 40 eggs,  $1.68 \times 1.15$  in. [ $40.8 \times 29.3$  mm.]. Incubation is shared by the sexes, and lasts about 17 days, the male as a rule sitting in the daytime, according to Saunders. Breeding generally begins about the first week of April, but nests have been recorded even in January and February (*Zoologist*, 1874, p. 3998), as well as March; and as fresh eggs may be found till October and even early in November, it is obvious that two or three broods are often reared in a season. [F. C. R. J.]

5. **Food.**—Grain, peas, beechmast, acorns, hazel-nuts, berries, leaves of clover, turnips, etc. [W. P. P.]

6. **Song Period.**—The cooing notes are heard "occasionally in January and February, and regularly from March to the beginning of October" (*British Birds*, iv. 276. C. J. and H. G. Alexander). [W. P. P.]

**STOCK-DOVE** [*Columba oenas* Linnæus. Blue-rock, sand-, or hill-pigeon, culver. French, *colombe*; German, *Hohltaube*; Italian, *columbaccio*].

1. **Description.**—The stock-dove is readily distinguished from its congeners, having no white in the plumage, and two imperfect black bars across the wing (Pl. 91.) Length  $13\frac{1}{2}$  in. [ $342.90$  mm.]. The sexes are alike. The upper parts are of a darker hue than in the rock-dove, the head, neck, scapulars and interscapulars being of a light slate-grey, the wing-coverts paler, and the rump pale bluish grey. On the side of the neck is a patch of iridescent, metallic green, with purplish red reflections. The innermost major coverts have a black spot partially overlapped by the median coverts, and the innermost secondaries have similar patches of black. The primaries are of a dark slate-grey with a whitish line along the fore edge of the outer web. The tail is light grey shading into black over the terminal portion. The throat, fore-neck, and breast have a vinous hue, the rest of the under parts are



grey. The cere is red, the iris dark brown. The legs and toes are pinkish red. The female is slightly smaller and duller. The juvenile (teleoptyle) plumage resembles that of the adults, but lacks the metallic reflections on the neck, while the black patches on the wings are barely traceable. [W. P. P.]

**2. Distribution.**—In the British Isles this species is somewhat local, but not uncommon in England and Wales, while in Scotland it has greatly extended its range of late years, and now not only breeds on the Moray and Dornoch Firths, but is also found in Sutherland and W. Ross, and has even occurred in the Orkneys and Shetlands (see *Ann. Scot. Nat. Hist.*, 1894, p. 3; 1896, p. 253; 1909, p. 115, etc.). It breeds in the Isle of Man, and is now resident in small numbers in Ireland and increasing its range, which, according to Mr. Ussher, has been extended through eastern Ulster and Leinster to Lough Derg (1896), S. Wexford (1900), and Athlone (1902). On the Continent it is found in Southern Scandinavia, in Russia up to  $61^{\circ} 40'$  in Finland and  $56\frac{1}{2}^{\circ}$  in the Urals, sporadically in Central Europe, south to Portugal, North Italy, North-West Africa, Montenegro, Rumelia, and the Danube valley, while apparently its range extends also into Transcaspia, but farther east it is replaced by the Eastern form, which ranges to Krasnoyarsk. In the southern part of its range it is a resident, but in Northern Europe it migrates southward during the winter months, and visits the Mediterranean region, while the Eastern race winters in India. [F. C. R. J.]

**3. Migration.**—Chiefly resident within our area, but probably also a winter visitor to a slight extent. "As a rule it leaves the northern portions of our islands in October and returns in March" (Saunders, *Ill. Man. B. B.*, 2nd ed., 1899, p. 482), but over a great part of our area it is not known except as a resident and more or less stationary species. On the east coast of Great Britain a slight autumn immigration from the Continent is sometimes observable (cf. *British Association Migration Reports*, v. p. 50; and Nelson, *B. of Yorks.*, 1907, p. 492). Gregarious on migration, and generally in winter, but seldom reported in flocks of very great size. [A. L. T.]

**4. Nest and Eggs.**—The nesting-site is almost always in a hole of some kind, very often in a pollarded tree or natural hollow, also in crevices of rocks, in rabbit-burrows among sandhills, in ruins or thick ivy, in nesting-boxes, under thick furze bushes, and occasionally in old squirrels' dreys or magpies' nests. It has also been known to breed among heather on a steep hillside, and where suitable holes were not available, on a ledge of a cliff, partly supported by brushwood. In most cases little or no nesting material is used, but instances are on record





Photo by F. E. Daniel

Ring-dove's nest



Photo by F. E. Daniel

Stock-dove's nest in a sandhill



Photo by Riley Fortune

Stock-dove's nest-hole in a cliff



Photo by Riley Fortune

Turtle-dove's nest







in which fresh and green leaves of laurel, horse-chesnut, etc., have been found in the nest. (Pl. XXXVIII.) The eggs are two in number as a rule, but three have been recorded several times (cf. *Zoologist*, 1876, p. 4875; 1880, p. 143; 1888, p. 393; *British Birds*, iv. p. 155, etc.). They are creamy-white in colour, more rounded in shape in most cases than those of the ring-dove, and tolerably glossy. Average size of 41 eggs,  $1.53 \times 1.13$  in. [ $39.1 \times 28.8$  mm.]. Eggs may be found from the beginning of March till the first half of October, so that probably two or three broods are reared in the season, but as a rule the first clutches may be found in April. The period of incubation is given by Naumann as 17 to 18 days, and he states that both sexes take part in incubation, the male relieving his mate from 9 or 10 A.M. to 3 or 4 P.M., and, like her, sitting very closely. [F. C. R. J.]

**5. Food.**—Chiefly grain, seeds of various weeds, acorns, beechmast, and berries. [W. P. P.]

**6. Song Period.**—The “cooing” notes are heard chiefly during the courting and nesting period. “It sings later in the autumn than the wood-pigeon” (*British Birds*, iv. 276. C. J. and H. G. Alexander).

**ROCK-DOVE** [*Columba livia* Gmelin. Cliff culver, doo (Shetlands), wild pigeon. French, *colombe biset*; German, *Felsentaube*; Italian, *piccione selvatica*].

**1. Description.**—The rock-dove may be distinguished at a glance by the large patch of white on the rump, and the two black bars across the wings. The sexes are alike. (Pl. 90.) Length  $13.50$  in. [ $342.89$  mm.]. The head and neck are conspicuously darker than the rest of the plumage and of a dark bluish grey, with a patch of metallic, iridescent green on the neck. The rest of the plumage is of a light blue-grey, the remiges dark slate colour. Tail dark blue-grey, shading into a black terminal bar, and having the outer webs of the outermost pair of feathers white. The two black bars across the wings and the white rump are conspicuous, and scarcely less so, during flight, are the white axillaries and under wing-coverts. The juvenile plumage is duller and lacks the metallic patch on the neck. [W. P. P.]

**2. Distribution.**—In the British Isles this species is chiefly confined to those parts of the coast where broken cliffs and sea-caves are found, and is consequently absent from the east coast of England south of the Spurn, and on the south is only of rare occurrence in the Devonian peninsula. It is found on the



Welsh coast, the Isle of Man, and Cumberland, while on the west coast and islands of Scotland, as well as on the Irish coast (especially on the western side), it is extremely common. In some places domestic pigeons which have reverted to a wild state have joined the colonies of wild birds. Besides the Orkneys and Shetlands, it is also found on the Færoes, but is now apparently extinct in Scandinavia. It is scarce in the Pyrenees, but occurs in S. Spain and Portugal, the Canaries, Azores, Madeira, the Cape Verde Isles, while in the Mediterranean region it is found in the Balearic Isles, Corsica, Sardinia, Italy, Sicily, Malta, the Balkan Peninsula and the Greek islands, Crete, North-west Africa, Cyprus, and also in the Crimea and Asia Minor, while allied forms occur in Senegal, North-east Africa and Arabia, and Asia generally from S. Persia to China and Japan. Throughout its range this species is resident. [F. C. R. J.]

**3. Migration.**—Resident and stationary: there is no evidence of the existence of any migratory habits in the species. [A. L. T.]

**4. Nest and Eggs.**—The usual site is on a ledge or in a crevice in a sea-cave, and often several pairs may be found breeding within a short distance of one another. In default of caves the rock-dove will nest in almost any deep crevice, and in the Mediterranean region has been known to nest in ruins, and even in the sides of deep wells; but in the British Isles it does not breed in the neighbourhood of human dwellings, and records from cliffs inland appear to refer to escaped pigeons which have reverted to the primitive type. The actual nest is a flimsy structure of grasses, twigs, roots, heather, or sometimes seaweed, and contains two white eggs. (Pl. 90.) Average size of 63 eggs,  $1.54 \times 1.15$  in. [ $39.2 \times 29.3$  mm.]. The breeding season is very prolonged, and several broods are reared. In the Shetlands, Saxby states that it breeds practically all the year round, and that where there is a sufficiency of food incubation is constantly in progress from the end of February to the end of October. He also found an almost perfect egg in the ovary of a hen on 21st January, but as a rule most eggs are found between April and August. Incubation, as observed in confinement by Mr. J. L. Bonhote, lasts 19 days, and Saxby notes that it is chiefly performed by the hen, who is fed on the nest by her mate, and occasionally relieved by him for a short period. [F. C. R. J.]

**5. Food.**—Grain, seeds, and roots of noxious weeds. [W. P. P.]

**6. Song Period.**—The bird is most vociferous during the breeding season. [W. P. P.]



**TURTLE-DOVE** [*Turtur turtur* (Linnaeus); *Turtur communis*, Selby. French, *tourterelle*; German, *Turteltaube*; Italian, *tortola*].

1. **Description.**—The turtle-dove differs conspicuously from its congeners, having the upper parts variegated with cinnamon-brown and black, and a patch of black and white on the side of the neck. The sexes are alike. (Pl. 92.) Length 11·25 in. [285·75 mm.]. The head and neck are of a pale bluish ash colour, the latter with a patch of black feathers tipped with white on each side. The wing-coverts and scapulars have broad margins of cinnamon-brown, the centre of the feathers being black. The rump is of a dark bluish grey, the feathers along the centre of this area obscured by broad margins of dull yellowish. The primaries are dark slate colour, with a narrow fringe of dull white along the outer vanes. The centre tail feathers are dusky brown with whitish tips, the rest black, with a broad terminal bar of white; the outer feathers with white outer webs. The throat and fore-neck are of a pale vinous hue deepening in the breast, while the abdomen and under tail-coverts are white. Around the eye is a circle of bare red skin, the iris is reddish brown, and the feet are red. The female resembles the male, but is duller. The juvenile dress differs from that of the adult in being altogether duller, and lacking the black and white patch on the neck, while the under parts are of a dull ash colour with a wash of fulvous brown. [W. P. P.]

2. **Distribution.**—A regular summer migrant to the southern part of Great Britain, but scarce along the western counties of England and Wales (Cornwall, Pembroke, Carnarvon, etc.), and has only been recorded as nesting on a few occasions in the northern counties (Northumberland, Cumberland, and Durham), though a few pairs probably breed in south Scotland. On the Continent it is rare in Scandinavia and Northern Russia, but is distributed over the rest of Europe as well as South-western Asia, while it is replaced by allied subspecific forms in North Africa and other parts of Asia. Its winter haunts are in Northern Africa, and it has occurred as far south as Abyssinia. [F. C. R. J.]

3. **Migration.**—A summer visitor. The extent of its British breeding area is indicated in the preceding paragraph: outside this the turtle-dove occurs as a bird of passage or as an irregular visitor. Thus its migrations only occasionally extend to the northern and western isles of Scotland, but Ireland is regularly visited on both passages, pairs occasionally remaining to nest (cf. Saunders, *Ill. Man. B. B.*, 2nd ed., 1899, pp. 485-486; Witherby and Ticehurst, *British Birds*, ii. pp. 125, 126;



and Ussher and Warren, *B. of Ireland*, 1900, p. 226). The immigration of the English summer visitant birds begins at the end of April or the beginning of May, continuing throughout the greater part of the latter month (cf. Ticehurst, *B. of Kent*, 1909, p. 380). In some seasons the immigration is noted as occurring almost solely on the shores of the south-eastern counties, in others along the whole south coast, "but first and chiefly on its eastern half" (cf. *B. O. C. Migration Reports*). The spring immigration into Ireland takes place on the coasts of Wexford and other south-eastern counties, and from these the movement spreads through the southern portion of Ireland, even to its south-western extremity; the subsequent emigration through the more northerly parts has not been studied in detail (cf. Ussher and Warren, *loc. cit.*; and Ussher, *Irish Naturalist*, 1909, p. 184). Some departures take place from Great Britain as early as August (cf. Ticehurst, *loc. cit.*), but September is the chief month of emigration. A small proportion linger still later, but such records of late birds as those at Lerwick, 4th December 1905 (cf. Paterson, *Ann. Scot. Nat. Hist.*, 1906, p. 199), and Penrith, 21st December 1894 (cf. Saunders, *loc. cit.*), must be regarded as purely exceptional. The turtle-dove is usually reported, as a migrant, as observed in pairs or small companies. [A. L. T.]

**4. Nest and Eggs.**—The usual site for the nest of this species is among the branches of a tree or in a straggling hedgerow, sometimes only a foot or two from the ground, and at other times 10 or 15 feet above it, but generally rather low down. Exceptionally it has been known to breed in squirrels' dreys (*Zoologist*, 1892, p. 310) and old nests of the rook (H. S. Davenport in Saunders' *Manual*, 2nd ed., p. 486). The nest is a very flimsy construction in most cases, and generally the outline of the eggs is plainly visible through the nest from below. (Pl. xxxviii.) It is built of a few fine twigs carelessly laid together, the materials being brought by both birds, but the actual building by the hen (Naumann). In some cases buttercup flower-stalks have been found as lining (*Zoologist*, 1907, p. 326). The eggs are two in number, white, with a very slight tinge of cream, rather elongated in shape, and somewhat pointed at one end. Average size of 26 eggs,  $1.18 \times .88$  in. [ $30.1 \times 22.4$  mm.]. Incubation lasts for 13-14 days according to Mr. J. L. Bonhote, who has bred this species in captivity, and the duty is shared by both parents. The usual breeding season in England begins during the last week or two of May and early in June, while it is probable that a second brood is frequently reared, as fresh eggs may be found at the end of July and the beginning of August. [F. C. R. J.]

**5. Food.**—Grain, small seeds, berries, small mollusca. [W. P. P.]



**6. Song Period.**—"Irregularly for a week after arrival, and then regularly to the beginning of August." Irregularly later. It has been heard as late as August 23. (*British Birds*, iv. 276. C. J. and H. G. Alexander.) [W. P. P.]

*The following are described in the supplementary chapter on "Rare Birds" :—*

Eastern turtle-dove, *Turtur orientalis* Latham.

[Passenger-pigeon, *Ectopistes migratorius* (Linnæus).]



## THE PIGEONS

[W. P. PYCRAFT]

Though the term "amphibious" is by common consent and usage restricted to those creatures which lead a double life, alternately on land and in the water, it might, with hardly less cogency, be applied to birds like the pigeons, for, as the most casual survey of their habits and general conformation shows, they too lead a divided life, alternately between lofty perches and the ground. Speaking broadly, they must be regarded as arboreal birds, though some never at any time in their lives seek harbourage amid trees, but spend their lives amid crags and beetling cliffs. But by the shortness of their legs it is obvious they are not ground dwellers. Some, however, have become so, and in these, be it noted, the legs are long, as in the great crowned pigeons, the Nicobar pigeon, the *Otidiphaps*, and the extinct dodo and solitaire, for instance. Their relationship to the plover-tribe is, externally, indicated in nothing but the form of the beak, which presents but little variation in shape, the tooth-billed pigeon (*Didunculus*) and the white-fronted ground-pigeon (*Henicophaps albifrons*) departing most markedly from the type in developing more massive jaws. They differ conspicuously from their relations, the plovers, in that their eggs, which never exceed two in number, are always white, and in that the young are but scantily clothed, emerging from the shell, indeed, naked, and with sealed eyelids, and remain long helpless in the nest, which is at best but an indifferently constructed platform of sticks.

The method of feeding the young is peculiar, since the nestling thrusts its beak within the mouth of the parent, who pumps up from the crop a milky fluid, secreted by the walls thereof, which are richly supplied with blood-vessels, as also is the skin immediately



surrounding the crop. The fluid is apparently sucked up by the young, and doubtless the great width and swollen margins of the lower jaw, at its base, considerably aid in this method of feeding.

The excrement of young pigeons, according to Seebohm,<sup>1</sup> is of a peculiar nature and without smell, so that it is never removed from the nest, and soon hardens on exposure to the air, thus converting the fragile, loosely constructed platform of sticks into a durable structure.

Of the 450 known species but four are to be reckoned among our native birds, and these represent two of the most typical genera; but many exotic species are conspicuous for the remarkable beauty of this coloration.

Since the eggs are laid in an open nest, it is somewhat remarkable that their shells should be white, all other birds which lay white eggs depositing them in holes, and, it has been assumed, for the sake of concealment. To explain the fact that species like the wood-pigeon and turtle-dove seek no such concealment, it has been contended that with these birds the whiteness of the shell is their protection, since the nest is so flimsy that light is readily seen through its interstices when the structure is seen from below, and this being so, the white shells become indistinguishable from flecks of light! As a matter of fact, the eggs seen from such a standpoint would appear black. Further, even if it were otherwise, it would afford no protection against the only foes that need be dreaded—those which can climb, or surmount the nest—squirrels and egg-eating birds. These can have but small difficulty in finding such quarry, at any rate with the early clutches laid before the leaves are fully out. Later a measure of protection is afforded by overhanging foliage. But it is clear that though the risk of destruction to which such eggs are exposed is considerable, the annual losses by the community cannot be heavy, or these birds would either have become extinct or they would have reverted to the ancestral habit of breeding in holes and caverns, like the rock-dove and stock-

<sup>1</sup> Seebohm, *British Birds*, vol. ii. p. 397.



dove. In short, it is because the wood-pigeon and turtle-dove are descended from hole-nesting ancestors that their eggs are white, the fact that they continue to lay white eggs shows that the lack of colour is no serious handicap in the struggle for existence.

These birds, like the parrots, kingfishers, and the host of other species which lay white eggs in holes, do so, not as Wallace contended, to conceal their eggs, but because they lay in holes. Such were probably the chosen sites of the primitive birds, and whiteness was absolutely necessary in order that the eggs should be visible, even if imperfectly, in the dim light which found entrance to the nest-chamber from the entrance hole. Without such guide the eggs would almost inevitably get broken before the incubation period was over, when the bird entered the nest to brood. Coloured shells appeared when such brood-chambers were exchanged for open nests, either to serve as a protective mantle, as in the case of the plovers, for instance, or possibly, as I have already suggested, to serve as a protection against excessive light. The fact, however, that ostriches and rheas, among struthious birds, lay whitish or creamy eggs which are often exposed for some time to the burning sun, militates, it must be admitted, against this idea that a light-screen is necessary.

A point in regard to the feathers of pigeons demands notice here. Some time ago I drew attention to the fact that if a feather of one of these birds be pressed upon, or squeezed between plates of glass, a perfect image of the feather, in the form of a pale blue film, remains. This film is formed by a waxy substance akin to that given off by "powder-down" feathers or "filoplumes," such as are met with in the herons, for instance. So far, however, no one has succeeded in discovering the origin of this filmy matter, or what purpose it serves, but to it must be ascribed the "bloom" which pervades the plumage of these birds when alive.



## THE WOOD-PIGEON

[W. P. PYCRAFT]

Of our native pigeons the wood-pigeon is undoubtedly the best known, as it is also the most numerous and the largest. In the open country one of the most wary and suspicious of birds, yet wherever amid cities large open spaces with an abundance of trees are to be met with, there the wood-pigeon takes up its abode, and loses at once its fear and dread of man: no others of our native birds display quite such trustfulness, though the sparrow and the water-hen run it very close in this respect. In the gardens of the Tuilleries years ago I witnessed—and others, perchance, may have the same good fortune to-day—a most interesting instance of the wonderful tameness which these birds may display while enjoying their full liberty, for “wild” birds they could hardly be called. In this particular case a man had long accustomed them to expect his appearance at a certain time during the day laden with food. The moment he arrived they clustered round him in eager excitement, alighting on his arms, shoulders, and head, and taking food from his hands and lips. Meanwhile a no less eager crowd gathered round his feet. Having rewarded one or two, he would, at a given signal, dismiss them, and others would at once take their place. And this system of rotation was constantly repeated till the store of food was done. In London parks, of which they began to take possession about the year 1883, a similar confidence in the human race is displayed: they will even alight on children’s perambulators to pick up bread if enticed to do so. All this is the more curious, because wood-pigeons reared from the nest away from towns generally develop all the wildness of their race as soon as they attain the power of flight.

During the last hundred years the numbers of this bird have increased amazingly, owing in part to the destruction of predatory



birds—hawks, jays, and magpies—which preyed either upon the birds themselves or their eggs, and in part to the increase of land under cultivation, and of plantations affording them harbourage for their nests. As a consequence, the suspicions and ominous forecasts of the generation of farmers which first began to perceive this increase have been amply fulfilled in some parts of the kingdom at any rate; for, without doubt, this bird, in many parts of the country, is at times a veritable scourge, devouring immense quantities of corn, young turnips, and clover, according to the season of the year. Years ago, on the other hand, when these birds were kept within bounds, partly by their natural enemies and partly by more restricted harbourage, things were otherwise. Thus, for example, we find St. John in his delightful *Wild Life in the Highlands* striving to convince a farmer that “an immense flock of wood-pigeons, busily at work in a field of young clover,” were really his benefactors. To prove his point he shot eight from the field which was being ravaged, and in the presence of the farmer straightway opened their crops. The results were exactly in accordance with his predictions. The birds had not been eating the clover, but “every pigeon’s crop was as full as it could possibly be of the seeds of the worst weeds in the country, the wild mustard and the ragweed, which they had found remaining on the surface of the ground. . . .” And, he continues, “no amount of human labour and search could have collected on the same ground, at that time of the year, as much of these seeds as was consumed by these five or six hundred wood-pigeons daily for two or three weeks together. Indeed, during the whole of the summer and spring, and a considerable part of the winter, all pigeons must feed entirely on the seeds of different wild plants. . . .” To-day the tide has turned in the opposite direction, and not without some reason, this bird is viewed with extreme dislike by farmers in many parts of the country. Mr. T. H. Nelson, after the usual gibe at the “sentimental cabinet naturalists,” tells us that the food of the wood-pigeon consists “chiefly of grain, peas, beans, beechmast, acorns, seedling potatoes, turnip-tops,



Plate 89

Ring-dove courting

By A. W. Seaby















bulbs, and seeds . . . picked up from the freshly sown drills . . . young clover, seeds of the wild mustard, charlock, dock and ragweed, gooseberries, and various other berries, seeds, and plants." The qualification "chiefly" appended to such a list, leaves one curious to know how the rest of the diet is made up! But it is clear that the wood-pigeon is not entirely harmful, as some would have us believe. Mr. Nelson himself remarks :<sup>1</sup> "In districts where it is not particularly numerous it probably does not harm the farmers' crops, but even benefits them, as, for instance, when unkindly weather in spring has arrested the growth of some of the white corn crops, allowing the hardy wild mustard to overtop the tender blade, the pigeon destroys the weed by stripping it of every leaf, and often the lowly chickweed furnishes it with an abundant repast." In the London parks, when this bird is abundant, I have frequently seen them, in the spring, feeding greedily on the young buds of plane trees, creeping as near to the end of the bough as possible, and craning their necks down to get at the end twigs just beyond them. The capacity of the crop, which has a peculiar bi-lobed shape, is astonishing. As many as sixty-one acorns have been taken from one such receptacle, from another seventy-three hazel-nuts. When a large flock is feeding, Mr. Abel Chapman tells us,<sup>2</sup> "among turnip fields, stubbles, or clover lea, they alternately feed and rest on the nearest trees, the birds in the latter position serving as sentries, whether purposely or by accident"; and, he continues, "a big pack of cushats on the feed can be made out a long way off by the habit of the rearmost birds continually flying up and alighting in the front rank, thus causing constant movement."

Reference has already been made to the enormous increase in numbers of the wood-pigeon, all over the kingdom, during the last century. A few figures may help to make this fact more readily apparent. Viscount Reidhaven, at the Central Banffshire Farmers Club, so far back as 1879, stated that on his father's estate, between

<sup>1</sup> *Op. cit.*, p. 91.

<sup>2</sup> *Bird Life of the Borders*, 2nd edit., p. 269.



the years 1876-79, 15,194 eggs, 1603 young birds, and 3733 old birds were destroyed, a total of 20,529. The amount of money expended as head-tax was £117, 13s. 3d. Similarly, the United East Lothian Agricultural Society, about forty years ago, over a period of about seven years, caused to be destroyed about 130,000 pigeons; but since 1870 the numbers of wood-pigeons in Scotland appears to have been materially decreased. Happily this bird affords most excellent eating, so that the slain can be utilised. Wherever their numbers increase sufficiently to demand drastic thinning operations, it is found more easy to attack them as they come home to roost than to endeavour to take them by surprise in the open. They always fly head to wind, and hence the guns must be placed accordingly. Mr. Abel Chapman, in his delightful *Bird Life of the Borders*, gives elaborate directions for such raids, and he further remarks that they vary their roosting-places according to the weather. In his own county a favourite spot was an old beech wood standing on high ground, and much exposed. But during rough or stormy weather they resorted to a low-lying wood of tall Scots firs. I have had many opportunities of studying these birds in Battersea Park, London, and note that, in the winter, when the trees are bare so as to reveal their movements, they congregate in considerable numbers, in certain parts, on the outskirts of the park, during the afternoon, then, as dusk falls, they betake themselves, gradually, to the trees on an island in the centre of a small lake.

In the matter of its plumage the wood-pigeon presents no very striking characters, but there is one peculiarity which I do not remember to have seen described anywhere. This refers to the arrangement of the feathers of the white neck patch and those immediately above, which have the appearance of being distributed in semicircular rows, divided by well-defined transverse spaces, thus recalling the longitudinal grooves down the necks of geese.

Of their habits during courtship, Mr. Edmund Selous writes: "The male . . . bows to the female lengthways along the branch on which he is sitting, elevating the tail at the same time, in just the



same way as does the stock-dove. As he does so he says "*coo-oo-oo*," the last syllable being long drawn out, and having a very intense expression with a rise in the tone of it, sometimes almost to the extent of becoming a soft shrillness. Having delivered himself of this long "*coo-oo-oo*," he says several times together in an undertone, and very quickly, "*coo, coo, coo coo*," or "*coo ooo, ooo, ooo, coo, coo, coo*," after which, rising, and then bowing, again he recommences with long-drawn, impassioned "*coo-oo-oo*," as before. Occasionally, when courting on the ground, according to Mr. Selous, the low bow is prefaced by one or more curious hops, a feature not remarked in any other of our native pigeons.

I also have had the good fortune to see something of this phase of the wood-pigeon's life-history, and have remarked that just before pairing they frequently feed one another, and immediately after each assumes a curiously "wooden" attitude, rearing the body upwards, and pressing the beak down upon the neck, which is thrust up as far as it can be strained, and these grotesque movements are accompanied by a strange raucous cry which refuses to be expressed in words. Of the earlier bowing and cooing, with inflated crop and outspread tail, which marks the beginning of courtship, there is no need to speak, for with this phase every one is familiar. This performance is varied by a very beautiful aerial display, the male launching himself into the air, rising and falling on outstretched pinions, in great curves high above the trees; occasionally the wings are brought smartly together over the back with a resounding snap. During such displays the white bar across the wing is most conspicuous. Both birds, I remark in my note-book, take part in the building of the nest; but the male alone appears to collect the sticks, which he brings to his mate. A very few are taken from the ground, nearly all are broken off from the tree. Suitable-looking twigs are seized by the beak and tugged at. If dead they readily break and are borne away, but should any drop they are not picked up. The growing nest which I kept under observation was placed on a big bough, close to the trunk of a



plane tree, and the sticks were passed to her in a curiously methodical, one might say mechanical manner, for though there was an ample fairway along the bough the bird always stood on the back of his mate and passed them over her head! This nest was completed in about three days. Both birds left the unfinished nest every night, and returned to their labours early in the morning.<sup>1</sup> On the fourth day the first egg appeared, and from then onwards she sat continuously, save for a short occasional break when she moved out along the bough of the tree for a few minutes, or went off to feed. The male during this time disappeared, save for an occasional visit. But during an unguarded moment, when the female seems to have gone off to feed, a carrion-crow came along and took the eggs. Both birds for about twenty-four hours hung about the empty nest disconsolately, and then betook themselves off, probably to try elsewhere! During the period of courtship, and the short spell of incubation before the disaster, the male kept up an almost continuous anthem of "cooing," "*coo-cōo-co-coo-co* ; *coo-cōo-co, coo-co.*" This "song," for most of us, has a peculiarly soothing effect, and it is not, happily, confined to this season of the year, for it may be heard in almost every month when the weather is fine.

## THE STOCK-DOVE AND THE ROCK-DOVE

[W. P. PYCRAFT]

The two species now to be considered present many points in common, and both differ, somewhat conspicuously, from the wood-pigeon, as will become plainly apparent presently. So similar in appearance, to the unpractised eye, are these two birds, that they are commonly confounded. This confusion is excusable, since, among the older ornithologists at any rate, Montagu, Bewick, and Fleming failed

<sup>1</sup> As has already been pointed out, p. 509, the wood-pigeon does not always take the trouble to build a nest, flimsy though this be; for it will adopt the deserted nests of sparrow-hawks and magpies as well as squirrels' dreys.



Plate 90

Rock-dove alighting on its nest

By Winifred Austen















to discriminate between them. Yet, as we have already shown, the two birds are readily distinguishable. The very name stock-dove is a witness to this confusion, for by some, indeed, it was used under the impression that this bird was the ancestor of domesticated races of pigeons, of which more presently. By others it is supposed to refer to the bird's habit of nesting in the "stocks" of pollarded trees. But be this as it may, this species is an interesting one, if only on account of the adaptability it displays in the character of its breeding-places, and for the curiously indecisive nature of its coloration. Even the black markings on the wings suggest tentative experiments, for as yet they are neither bands nor spots, and, be it noted, they are wanting in the young, from which we may infer that there are incipient bands some day to be completed.

In its general habits it consorts alike with the wood-pigeon and the rock-dove, circumstances determining the association.

Of its courting habits Mr. Edmund Selous has made a few interesting observations. As seems to be the rule among pigeons, there is a great display of bowing, the breast meanwhile being inflated, and the tail spread fan-wise. Sometimes the male and female bow facing one another, sometimes one stands behind the other, so that one bird bows into space. But during this ceremony it would seem, with the stock-dove no sound is uttered. This curious performance takes place, as with the wood-pigeon, both on the ground and in the trees. Occasionally both male and female rise in the air and make much battle there, every now and then bringing the wings together with a smart snap, a sound which Mr. Selous supposes to be caused by one bird striking at the other with its wing in mid-air, but there is no sort of evidence that this is the case; on the contrary, it is highly improbable. The importunate male is, however, often repulsed by a blow of the wing when paying his attentions on the ground, just as the female sparrow will resist unwelcome or untimely attentions by seizing her would-be suitor by the feathers of the nape. The female stock-dove, however, having



driven away her suitor, will often bow as her crestfallen swain is retiring.

While the stock-dove is almost silent during his courtship, this is by no means true of the rock-dove, whose notes recall those of the wood-pigeon—"coo, coo, roo, coo"—and it is particularly vociferous during the early spring, when the male is intent on wooing. "At this season of the year," remarks Seebohm, "the male may often be seen performing various antics, and caressing his mate on the rocks, in a precisely similar manner to that of the domestic pigeon. He swells out his throat, droops his wings, and spreads out his tail like a fan, all the time serenading her with his soft winning notes; and should she take wing, he flies impetuously after her to repeat his courtship." But according to Mr. J. L. Bonhote, both the stock-dove and the rock-dove display something of the tyrant at this time, "driving the hen for a few days before she lays. On these occasions his whole time is spent in keeping her on the move, and he never lets her settle or rest for a minute, except on the nest."<sup>1</sup>

In their selection of a nursery these two birds present much in common, since both find congenial accommodation amid the crevices of sea-girt cliffs. But with the rock-dove such nesting-sites appear to be indispensable, for it never alights in trees. The stock-dove, on the other hand, nests also in limestone crags and quarries, hollow trees, the heads of pollard willows, on the beams of old church towers, squirrel dreys, and the deserted nests of other birds, *e.g.* magpie or crow, and in rabbit-burrows. In the open districts of Norfolk and Suffolk rabbit-warrens afford this bird excellent breeding grounds. Some occupy deserted rabbit-burrows, laying their eggs either upon the bare sand or a small quantity of fine roots, about a yard from the entrance. Some, on the other hand, seek the centre of dense furze bushes, using the entrance made by rabbits near the ground.<sup>2</sup> The young, which are ready for table early in June, are eagerly sought for by the warreners, to whom they are a considerable

<sup>1</sup> Bonhote, *Birds of Britain*, p. 272.

<sup>2</sup> Stevenson, *Birds of Norfolk*, vol. i. p. 356.



source of profit. In consequence, almost every warrener keeps a "dawe-dawg"—that is to say, a dog trained to discover the burrows which contain the quarry.

The nest of the rock-dove, which is a scanty structure, is made of dry grass or seaweed, a dead stick or two, and sometimes a bit of heather; and this is laid on some convenient ledge in a rock crevice, or, for choice, in the roof of some great cave, and it would be hard to find a more awe-inspiring chamber for a nursery. The roof, wherever the daylight reaches it, stands revealed in all the colours of the rainbow, strangely intermingled, the floor a shelving beach at low-water, at high, and in rough weather a swirl of angry heaving waters which, flinging themselves at the walls, fall in torrents with a booming as of thunder. Every ledge lodges a nest of cormorants or gulls, while puffins and pigeons share the crannies between them. Though both birds take part in the work of incubation, the female performs the greater share of the task, but she is all the while assiduously fed and tended by her mate. Two or three broods are reared in the year, and it is significant that the eggs are slightly smaller than those of the stock-dove, and that the young do not leave the nest till well able to fly.

Though, after the manner of its tribe, the clutch is limited to two eggs, yet the stock-dove is a fairly prolific bird, rearing two broods in a season. Still it must have many enemies, for it is a comparatively solitary species, and nowhere very abundant—measured by the standard of the wood-pigeon. Nevertheless the stock-dove, remarks Howard Saunders,<sup>1</sup> is a south-eastern species, which has been slowly increasing its range throughout these islands during recent years. It was unknown in Northumberland, remarks Mr. Abel Chapman, till the early eighties. Out of some thousands of wood-pigeons killed at Silksworth during twenty winters, not a single stock-dove was taken till 1879, "then we got one which was considered a rarity." The following winter three or four were taken, while during the winter of

<sup>1</sup> Ussher and Warren, *Birds of Ireland*, p. 223.



1884-85 they were quite common. They sometimes flew to roost with the wood-pigeons, and birds of both species were killed out of the same flock, but more often the stock-doves came separately in small parties of six or eight. Similarly it has extended its range into the south-western counties of England and into Wales. In Ireland it was unknown till 1875, but is now resident in parts of Leinster and Ulster,<sup>1</sup> and is gradually increasing its range. In Ireland, as elsewhere, it commonly associates with ring-doves, but always seems to separate from its congeners on taking flight, when, by their smaller size and more rapid wing-beat, they are readily distinguished.

This gradual extension of range is interesting, and would seem to be due in no small degree to the bird's ability to adapt itself to circumstances, especially, as we have already pointed out, in the matter of breeding-sites. Yet this interpretation is hardly adequate, since the wood-pigeon, showing less resource, is by far the commoner species. It is significant, indeed, that in no part of its range without the British Islands is it met with in so great abundance as its larger congener the wood-pigeon.

By the destruction of its enemies, as we have already shown, the wood-pigeons' population has become abnormally high, and hence, from the stress of obtaining sufficient food, a bird at one time regarded with favour by the farmer is now banned as an outlaw. One cannot help speculating as to the future of the stock-dove, which is, as we have shown, also increasing, and may, in consequence, be similarly driven to take an undue toll of the fruits of man's labour, for in the matter of its choice of food it closely resembles the wood-pigeon. But it is significant to note that in the case of a bird of each species, shot at one discharge, the crop of the wood-pigeon contained a great mass of clover, turnip-tops and bulbs, the crop of the stock-dove contained an egg-cupful of charlock seeds, some barley, and several weed seeds, but no clover.<sup>2</sup> The only charge so far levied against the stock-dove

<sup>1</sup> Ussher and Warren, *Birds of Ireland*, p. 223.

<sup>2</sup> Yarrell, *British Birds*, vol. vii. p. 8.



Plate 91

Stock-dove drinking

By G. E. Collins









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is that of damage to bean and pea fields, and to mustard-fields when the seed is ripe, and this liking for mustard it shares in common with the turtle-dove, while the wood-pigeon appears rarely, if ever, to eat these seeds; but the harm wrought is not great, and seems to be more than atoned for by the great quantities of charlock seeds consumed by these birds and of which they are especially fond. The rock-dove, being nowhere so abundant as the stock-dove, a fact sufficiently explained by its conservative habits, its numbers are not sufficiently great to enable it to commit "ravages" on the farmers' crops, even though it be compelled to fly inland for the greater part of its food. Like its congeners, it is partial to grain, but it atones for this weakness by eating the roots of the couch-grass (*Agropyron repens*) and the seeds of numerous troublesome weeds, as well as large quantities of snails. The bird's-foot trefoil is among the seeds which it specially favours.

Like its congeners the rock-dove drinks frequently, and in Egypt, in places where the banks of the Nile are so steep that the birds cannot alight on the shore to drink, both Mr. R. S. Skirving and Mr. E. C. Taylor have observed whole flocks settle on the water like gulls and drink while they floated down-stream: and the same habit has been observed in tame pigeons at Cologne when the shore-ice in the Rhine prevented approach to the water. Unlike most birds the head is not raised during the act of drinking.

Of its habits we have yet much to learn, for it has been, and still is, commonly confused with the stock-dove, and consequently records from places frequented by both species are to be regarded as requiring revision. At all times gregarious, it is not a migratory bird, though in hard weather it will wander from its usual haunts, sometimes in great flocks.

That this is the bird from which all our varieties of domesticated pigeons have been derived is certain, and if only for this reason the rock-dove is a species of quite peculiar interest. As we have already remarked, it never alights in trees, a peculiarity shared by its domesticated descendants, and is rarely found away from surf-beaten cliffs.



But even here it is now difficult to secure pure-bred birds, owing to interbreeding with dove-cot pigeons decoyed away from home. Last year (1910) I endeavoured to secure pure-bred birds from caves in Donegal, but out of about twenty birds shot all but two showed more or less evident traces of interbreeding with house-pigeons: some could not be distinguished from "blue-rocks." Darwin, it may be remembered, long ago drew attention to a very curious fact in regard to the coloration of the rock-dove, and the domesticated variety thereof, which so far has received no explanation. "There seems," he says, "to be some relation between the croup being blue or white, and the temperature of the country inhabited by both wild and dove-cot pigeons; for nearly all the dove-cot pigeons in the northern parts of Europe have a white croup like that of the wild European rock-pigeon; and nearly all the dove-cot pigeons of India have a blue croup like that of the wild *C. intermedia* of India."

Are we to infer from this that the presence or absence of pigmentation is determined by climate? or that the white area is a colour variation, or colour "mutation," whose presence or absence is determined by Mendelian factors? That is to say, the coloration of the rump is determined not by climate, but by germinal variation, and the interbreeding of birds presenting two forms of this variation. There are inexplicable and contradictory features in either interpretation, and it were profitless to pursue the theme further. Let it suffice to draw attention to the problem, which stands where it was when Darwin propounded it

## THE TURTLE-DOVE

[W. P. PYCRAFT]

The turtle-dove differs conspicuously from our other native pigeons in coloration, the dominant hue of the upper parts being ochreous yellow, while the beautiful metallic iridescence of the neck is entirely wanting. Furthermore, unlike its congeners in these



islands, it disappears entirely during the winter months, which are spent in more southern latitudes. In its habits it more nearly recalls the wood-pigeon, since it shows a preference for park-lands, woods, and plantations, and hence, like the wood-pigeon, its numbers during recent years have considerably increased, though, as will have been already remarked, it is still a rare bird both in the northern portions of Great Britain and in Ireland. Somewhat less gregarious than its congeners, it gathers, however, in flocks in autumn, young and old resorting to the stubbles and root-crops, devouring such grain as may be picked up, and besides, a considerable quantity of the seeds of weeds. It drinks frequently, and seems to show a decided liking for salt water, and hence Stevenson suggests that this is the reason why this bird is so abundant near the coast. Other pigeons are known to prefer brackish water to fresh. The flight is swift and powerful; often, as is the custom among the pigeons, the wings are brought smartly together over the back, producing a sharp, snapping sound.

Mr. Edmund Selous has described the courting-habits of the turtle-dove in some detail. The display made at this time resembles that of other pigeons, but the bowing of the male differs from that of, say, the wood-pigeon in that it takes the form of a series of "quick little bows, or rather bobs," . . . "instead of one or more slower and much more imposing ones." All the while this "bobbing" is going on he "utters a deep rolling, musical note, which is continuous (or sounds so), and does not cease till he has got back into his more everyday attitude. When this ceremony is performed on the ground, it would seem that between the bows he makes a "curious dancing step towards the female." But besides this, "these birds," continues Mr. Selous, "have another and charming nuptial disportment." Herein one of a pair sitting in some high tree will every now and then fly out and upwards, make one or two circling sweeps around and above it, and then after remaining poised for some seconds, descends on extended wings in the most graceful fashion, alighting on the same branch beside his waiting partner.



The duties of nest-building, incubation, and the care of the young are, as in the other species herein described, shared by both sexes. But the nest, as a rule, is a very flimsy structure, though Seebohm says that occasionally it is much more compactly built. As in the case of the wood-pigeon, it is never placed in holes or burrows in the ground; but while the wood-pigeon always places its nursery high up, this is by no means true of the turtle-dove, which is often content with low shrubs, or a high, thick hedge, as a lodgment for its cradle. Occasionally, however, it will select the boughs of a tree forty feet from the ground.



Plate 92

**Turtle-doves**

By A. W. Seaby















# PALLAS'S SANDGROUSE

[ORDER: *Charadriiformes*. FAMILY: *Pteroclidæ*]

## PRELIMINARY CLASSIFIED NOTES

[F. C. R. JOURDAIN. W. P. PYCRAFT. A. L. THOMSON]

**PALLAS'S SANDGROUSE** [*Syrrháptes paradórus* (Pallas).]

French, *syrrhapte* (no popular name); German, *Steppenhuhn*; Italian, *siratte*].

1. **Description.**—Pallas's sandgrouse may be distinguished at once by the shape of the sole of the foot, all the toes being enclosed within a common pad. The hind-toe is wanting. There is a marked difference in the coloration of the sexes. (Pl. 93.) Length, 14·5 in. [368·29 mm.]. The male is a light sandy buff colour, inclining to greyish on the crown, while the throat is yellow, deepening on the fore-neck to rust colour. The fore-breast is greyish buff, bordered behind by a band formed of three crescentic lines of black on a white ground. The breast is sandy buff, with a broad band of dark chocolate-brown across the middle; the abdomen and under tail-coverts are white. The interscapulars and scapulars are of a sandy buff, the former heavily barred with black, the latter, similarly barred, is marked in addition with large spots of mahogany red. The wings are sandy buff, the marginal coverts spotted with black: the major coverts sienna-red. The primaries, the outermost of which are produced into filiform points, are lavender-grey with broad white margins. The tail is dark grey, barred buff and tipped white, but the two centre feathers are buff, barred with grey at the base and passing backwards into long black filaments. The female is similarly of a sandy buff colour, the throat and sides of the neck are pale yellow, the former bounded by a narrow line of black,



absent in the male. The fore-breast is spotted with black, but the lower pectoral band of black and white is wanting, and the chocolate patch on the mid-breast is much smaller and duller. The crown and hind-neck are striated with black; the primaries, like those of the male, but duller, and with less pointed ends; the tail is similarly less pointed. The juvenile plumage resembles that of the adult female, but has the neck and fore-breast barred with irregular black bars, while the bars on the interscapulars are very irregular in shape, the black patch on the under parts is also wanting, and the wings and tail do not terminate in filaments. The young in down, which is apparently a mesoptyle down, are of a pale buff colour with nine or less distinct longitudinal lines along the head and back of sienna and brown, bordered with narrow dotted lines of black. The general effect is almost that of a piece of 'wool-work' and is difficult to describe. This effect is due to the 'feathery' nature of the down which is of a less degenerate character than that of the 'game-birds.' [W. P. P.]

**2. Distribution.**—This species has only been known to breed regularly in Europe since 1876, when Henke found it breeding in the Kirghis steppes near Astrakhan, and was assured by the inhabitants that it had not nested there before. It has recently extended its range also to the Ufa government (cf. *Ornitholog. Jahrbuch*, 1908, p. 232). In Asia its breeding range extends from north-eastern Turkestan through the desert regions of Central Asia east to Transbaikalia and Mongolia. Its northern limit in Asia extends to about lat. 51° N., while in Tibet it is replaced by the larger Tibet sandgrouse. Its ordinary winter range is regulated by the climatic conditions, but during severe weather it ranges to the plains between Peking and Tientsin (*Ibis*, 1861, p. 341), but is unknown in the Indian sub-region, and is apparently only subject to local movements in Russia and Turkestan. The abnormal westward migrations are treated more fully below and on p. 98. During these incursions attempts to breed have taken place in Denmark, Schleswig-Holstein and Hanover in Germany, Holland, and the British Isles. For details of British records see *Birds of Yorkshire*, ii. p. 502 (cf. also Whitaker, *Notes on the Birds of Notts*, p. 222; and Stevenson and Southwell, *The Birds of Norfolk*, iii. p. 393); Newton, *Ibis*, 1890, p. 213, and Harvie-Brown and Buckley, *A Fauna of the Moray Basin*, ii. p. 132. [F. C. R. J.]

**3. Migration.**—A very irregular visitor from the Central Asian steppes beyond the Caspian Sea, sometimes occurring in large numbers, and occasionally surviving in the British Isles to breed in two consecutive seasons. The extraordinary "irruptions" of this species cannot be strictly classed as true migratory



movements, but a chronological summary of the movements affecting our area may well be given under this head :—

1859. Several were obtained in different parts of the British Isles, including some in Kent, Norfolk, and Wales: the three Kentish specimens constitute the earliest evidence of the species' occurrence in the British Isles.
1863. The first great invasion on record occurred in this year. From the south-eastern countries of Europe the birds spread as far as the British Isles. The first British examples for this year were seen in Northumberland on 21st May, and on the same date the species was first observed on Heligoland. During the summer it became abundant in the British Isles, and was noted in the Shetland Isles, the Outer Hebrides, Co. Donegal in Ireland, and other outlying parts, although the majority of the records were from the eastern parts of Great Britain.
1864. The last British survivors of the previous year's invasion were recorded from Wales in February.
1872. Small flocks were reported from Northumberland and Ayrshire.
1876. Sandgrouse were reported from Norfolk in May, and from Co. Kildare (Ireland) in October. This slight invasion is of special interest, seeing that in this year a new colony was successfully established on the Kirghis steppes, between the Caspian Sea and the Volga.
1888. The greatest known movement of these birds took place in this year. Towards the beginning of March it was reported from Eastern Russia that the sandgrouse were already moving. As in 1863, the movement spread all over Europe, and reached the British Isles in May. Also as before, the birds were chiefly noted in the eastern parts of Great Britain (it was estimated that 1500 to 2000 birds reached Scotland), but some were recorded from such outlying parts as the Shetland Isles, the Outer Hebrides, and Belmullet (Co. Mayo), the extreme north-western point of Ireland. Many of the birds bred. Large numbers were shot, and many others quitted our shores or succumbed to the damp climate.
1889. A few birds survived the winter, and a nestling was found in Moray in the summer of this year.



- 1890. A few were recorded from various parts of the east of England (Norfolk, Lincolnshire, Yorkshire).
- 1891. Recorded from Yorkshire, and the Moray area in Scotland.
- 1899. Reported from Lincolnshire and Yorkshire.
- 1904. Reported from Yorkshire.
- 1906. Recorded from Norfolk, Yorkshire, and East Lothian.
- 1907. One reported from Middlesex.
- 1908. A slight invasion was noticed in this year over a considerable part of Europe, including England (Kent, Essex, Hertfordshire, Yorkshire, Cheshire, etc.).
- 1909. Reported from Yorkshire.

(Cf. Newton, *Ibis*, 1894, p. 186; Ussher and Warren, *B. of Ireland*, 1900, pp. 227-229; Witherby and Ticehurst, *British Birds*, ii. pp. 126, 127; Gätke, *Vogelwarte Helgoland*, Eng. trans., 1899, pp. 438-442; von Tschusi zu Schmidhoffen, *Mittheil. Nat. Ver. Steiermark*, 1889, *Der Zug des Steppenhuhnes nach dem Westen*, 1908 (1909); Jourdain, *British Birds*, iii. pp. 344-346; Macpherson, *Visitation of Pallas's Sandgrouse to Scotland in 1888*; W. Evans, *Proceedings of the Royal Physical Society, Edinburgh*, x., pt. i., 1889, pp. 106-126; Southwell, *Birds of Norfolk*, iii. pp. 392-396 (cf. i. p. 376), and *Zoologist*, 1888, pp. 442-456; Bolam, *Berwickshire Naturalists Club Transactions*, 1889, pp. 1-24; and others).

Of the habits of the sandgrouse as a traveller it is unnecessary to say more than is sufficient to emphasise the erratic nature of the movements. Of the 1863 irruption as observed on Heligoland it was remarked that "small bands of three or five, but also larger ones of twenty and even fifty individuals, were seen almost daily, and sometimes, though in rarer instances, flocks of a hundred or more. These latter for the most part were observed hastening along at a tremendous speed, the flights, however, not proceeding in one direction, after the manner of a fixed migratory movement, but irregularly in all directions, according to what appeared to be the prevailing mood of a particular company" (Gätke, *loc. cit.*). This erratic nature of the movement, coupled with the irregularity of the occurrence of such movements, and with the absence of any definite return movement, separates these phenomena from those of true migration. The movements are probably to be regarded rather as sudden attempts at extension of range, due to obscure causes the nature of which need not be discussed here. In support of this explanation we have the evidence of the successful establishment of a new colony after



the invasion of 1876, as already mentioned. The more gradual extension of the species' breeding range into European Russia during recent years must also be noted (cf. Remann, *Ornitholog. Jahrbuch*, 1908, p. 232). The irruptions into western and northern Europe may perhaps be considered to be mysteriously exaggerated and extended phases of these more explicable movements. But as such they are certainly almost without parallel: gradual range extensions are common occurrences (e.g. hawfinch, shorelark; cf. *antea*, vol. i. pp. 66, 204), but sudden invasions have seldom been known, one of the few other instances being that of the rose-coloured starling, whose movements, however, are more easily accounted for (cf. *antea*, vol. ii. pp. 108-109, 137-138), and the crossbill. [A. L. T.]

**4. Nest and Eggs.**—Practically no nest is made by this bird; the hen scratches out a hollow in a spot where there is light sandy or salt-impregnated soil. Sometimes a little marram grass is added by way of lining, and in Siberia shoots of the various salt-loving plants which grow in the vicinity are also sometimes but not always used. W. H. Bateson (quoted in *Ootheca Wolleyana*, ii. p. 11) found many nests on the Shu River, Turkestan, in depressions among the tufts of *Artemisia* which covered the steppe. The eggs are usually 2 or 3 in number, quite exceptionally 4, and are elliptical in shape, so that the "big" and "little" ends are practically indistinguishable. They do not vary much in colour and markings, but the ground colour ranges from light stone-colour to warm brownish, and they are irregularly spotted and blotched with small or medium-sized markings of deeper brown, and underlying smudges and spots of pale ashy grey. (Pl. F.) Average size of 71 eggs,  $1.65 \times 1.16$  in. [ $42.1 \times 29.6$  mm.]. The breeding season in Asia begins, according to Radde, about 13th April, while two or even three broods are said to be reared during the season. Fresh eggs can undoubtedly be obtained till the end of May in Asia, and probably also later, while in Europe they have been laid as late as 19th June, and the newly-hatched chick described by Professor Newton was found on 8th August. As the incubation period is estimated by Christiansen at about 24 days (although some eggs placed in an incubator by Blaauw took 28 days to hatch out), the egg from which this chick was hatched could not have been laid earlier than about 10th July. Incubation is, as far as we know, performed by both sexes; and in the case of at least two other species, the male bird takes charge of the eggs at night and the female by day. [F. C. R. J.]

**5. Food.**—In Asia the normal food of this species consists of the seeds and also the fleshy shoots of the various salt-loving steppe plants, such as *Salsola* seeds and shoots of *Salicornia* (Radde), and seeds of *Agriophyllum gobicum* (Prjewalsky).



Christiansen reared a young bird on grass and clover seed, and G. Sim, in the *Vertebrate Fauna of Dee*, p. 158, gives the following list of food plants which have been satisfactorily identified in the British Isles: Yare or spurrey, *Spergula arvensis*; knot grass, *Polygonum aviculare*; clover, probably *Trifolium pratense*; orache, *Atriplex babingtonii*; flowers and seed of small yellow clover, *T. minus*; mouse-eared chickweed, *Cerastium vulgare*; eyebright, *Euphrasia officinalis*; leaves and seed of sorrel, *Rumex acetosella*; chickweed, *Stellaria media*; dock, *Rumex crispus*; rye-grass, *Lolium perenne*; broom, *Spartium scoparium*; *Molina cærulea*; bent, *Triticum junceum*; various vetches, and indeed *Leguminosæ* generally; barley, wheat, and oats; large seeds apparently of the apple; and the chrysalides of some small moth. The chief article of diet was yare seed: often three-quarters of an ounce were taken from a single crop. Chapman (*Bird Life of the Borders*, 2nd ed., p. 141) records seeds of the common field runch, a noxious weed, in birds shot on Holy Island. Tegetmeier found chiefly chickweed and *Poa annua*; and Stevenson gives details of the contents of the crops of Norfolk killed birds in vol. i. p. 394 of the *Birds of Norfolk*. For summary of results of food investigation on the Continent see Naumann, *Naturgeschichte der Vögel Mitteleuropas*, vii. p. 37. [F. C. R. J.]

**6. Song Period.**—Whether the cries uttered by the male birds in flight represent the song of this species is not clear, but all observers note that these sounds are continually uttered in the spring and early summer, and Captain Dunbar-Brander notes that when the birds arrived in May they flew with a cry, “*chak, chak*,” while in October nothing was heard but the loud “sough” of the wings, no cry (*A Fauna of the Moray Basin*, ii. p. 139). [F. C. R. J.]



## PALLAS'S SANDGROUSE

[F. C. R. JOURDAIN]

This remarkable bird occupies quite a unique position among our British birds, for it cannot be classed as a resident, though it has been known to breed and to stay through the winter, nor as a regular summer or winter visitor or passage migrant, though it has visited our shores on many occasions. Probably the closest parallels are to be found in the cases of the continental crossbill and the rose-coloured starling, although in the latter instance there is no proof of its having bred within our limits, while the former has established itself as a resident in a few localities for some years at any rate. There seems to be no doubt that a considerable increase has, however, taken place in the breeding range of the sandgrouse in a westerly direction of late years on the Continent, so that we may confidently expect further visits, and it is possible that in some favourably situated localities the bird may, if efficiently protected, even become established as a breeding species with us.

Pallas's sandgrouse is the only representative on the British list of the group *Pterocletes*. They form a tolerably well-defined order, showing affinities in many respects with the *Columbæ* or pigeons. Huxley, writing in 1868, and basing his conclusions almost entirely on osteological grounds, regarded them as forming a transition group between the pigeons and the fowls (*Galli*). Since that time the anatomy of these birds has been studied by Garrod, Brandt, Gadow, and Beddard, and is now much better known. Beddard sums up his chapter by saying that "the *Pterocletes* occupy a lower place than the *Columbæ*—that *they* have given rise to the *Columbæ*, and not *vice versa*. . . . On the whole it seems not unreasonable to look upon the *Pterocletes* as not far from the stock which produced the *Limicolæ*, which itself was possibly not far again from the primitive



gallinaceous stock.”<sup>1</sup> The sandgrouse are divided by most writers into two genera,<sup>2</sup> *Pterocles* and *Syrrhaptes*. No member of the former has as yet been recorded from the British Isles, although two species are found in Spain, and are birds of powerful flight. The genus *Syrrhaptes* is represented by one species only, the subject of this paper.

In the hand Pallas's sandgrouse can at once be distinguished from any other bird on the British list by a glance at the feet. In the first place they are feathered down to the nails on the upper surface: the hind toe is altogether wanting, while the three front toes are encased in a common “podotheca,” which Newton compares to a fingerless glove, and the under surface of which consists of a leathery pad covered with small circular warts, closely packed together, from which the three blunt nails protrude. The true home of this erratic species lies in the deserts of Central Asia, its eastward breeding limit being the steppes by the river Argun in Transbaikalia and Chinese Mongolia, and extending thence over the vast desert of Gobi south to the northern borders of China and westward through Dzungaria, the Tian Shan district, and the Kirghis steppes in Turkestan. Of late years it has also established itself in European Russia in the Ufa government and Astrakhan, west to the Volga. Here it is either resident or partially migrant, according to climatic conditions. There are great differences in the winter temperatures of the elevated plateaux and the more sheltered districts of these regions. In some of the more exposed parts, the whole country is frost-bound and deep in snow for three or four months in the year, while, on the other hand, Mr. Carruthers found the Zarafschan valley good collecting ground through the winter. The seasons also naturally vary in severity. Thus in the winter of 1860-61 Swinhoe found this species extraordinarily abundant on the plains between Peking and Tientsin, so that the market at the latter place was glutted, and birds could be

<sup>1</sup> F. E. Beddard, *The Structure and Classification of Birds*, p. 319.

<sup>2</sup> The pintail-sandgrouse has also been made the type of a third genus (*Pteroclorus*) by Bonaparte.



bought for next to nothing. Dr. G. Radde<sup>1</sup> describes how the first flock of would-be breeding birds arrived at the Tarei-Nor on March 10, 1856, when the thermometer at night fell to  $2\frac{1}{2}^{\circ}$  (nearly  $30^{\circ}$  below freezing-point), while at midday it only reached  $37^{\circ}$ . It is evidently a very hardy bird, capable of withstanding a considerable amount of cold. In the Tian Shan district too, Schalow<sup>2</sup> states that it breeds as high as the juniper region, some 10,000 feet above sea-level. In these desert regions it has few enemies. Occasionally a Shangar falcon may succeed in striking down one or two, but it is by no means invariably successful. Predatory mammals are rare, and the barren nature of the country prevents the possibility of an unobserved approach, while the extremely rapid flight of this species renders its capture on the wing unlikely.

According to Radde's observations, the eggs of the first brood are laid between the beginning of April and the end of the third week of that month. He also saw young following their mother at the end of April. Late in May he found them assembled in huge flocks, which soon afterwards disappeared, returning again in the autumn. Prjewalsky's eggs were taken in Ala-shan early in June, while most of those taken by Russian collectors in 1906, and sent to Europe in large numbers, were obtained during April and the early part of May. As a large proportion of the birds which have visited us have arrived in May, it is evident that they must have left their homes and moved westward with the intention of breeding. Radde was of opinion that they bred twice, if not three times, in the season, and with no serious check to operate upon them, it is not surprising that the increase in their numbers has resulted in extensive westward movements in search of new breeding-grounds.

The extraordinary phenomenon of the invasion of Europe by a hitherto unknown game bird naturally attracted the attention of naturalists, and the subject has been treated at different times by various writers. The most important papers

<sup>1</sup> G. Radde, *Reis. im Süd. v. O. Sib.*, ii. p. 292.

<sup>2</sup> *Jour. f. Ornith.*, 1908, p. 92.



on the subject are those by Professor Newton in the *Ibis* for 1864, pp. 185-222, in which the invasion of 1863 is described; while von Tschusi has chronicled the irruptions of 1888 and 1908.<sup>1</sup> H. A. Macpherson has also published a pamphlet on the *Visitation of Pallas's Sandgrouse to Scotland in 1888*; A. B. Meyer and F. Helm also described the progress of the 1888 invasion through Europe,<sup>2</sup> and Dr. Leverkühn compiled a useful bibliography of the species which appeared in the *Ornithologische Monatsschrift* for 1888-1892. The German records for 1888 were summarised by Dr. Reichenow in the *Journal für Ornithologie* for 1889, pp. 1-33, and useful contributions have been made by Holtz, von Homeyer, and others.<sup>3</sup>

Within the limits of this article it is impossible to describe these invasions in detail. In the "Classified Notes" will be found a summary of the British records, and a comparison with the continental notices of its appearance is interesting. The first straggler reached Sarepta in 1848, and in 1853 it was mentioned by Möschler as of very rare occurrence on the Lower Volga. In 1859, when it was first noted in England, one was obtained at Hobro, Jylland, and one of a pair was shot at Zandvoort in Holland, while a pair was reported to have been killed in the Wilna government of Russia, and another was found in the market at Perpignan (Pyrenées orientales). One was also obtained at Sarepta in 1860.

In 1861 and 1862 some were observed, and one obtained, in Holland, and a flock was recorded from Szegedin.

During the first great invasion of 1863-64, the records extended northward to Thorshavn in the Færoes, Mandal in Norway, Nyköping in Sweden, and Archangel in Russia, while southward it occurred as far as Perpignan and Biscarolle (Pyrenées), and Rimini,

<sup>1</sup> Von Tschusi zu Schmidhoffen, *Mittheil. Nat. Ver. Steiermark*, Separat-Abdruck (1889), and *Der Zug des Steppenuhnes nach dem Westen*, 1908, (1909).

<sup>2</sup> *Abhandl. u. Ber. des Kgl. Zool. u. anthrop.-ethnol. Museums in Dresden*, 1888-89.

<sup>3</sup> See also the literature quoted in Naumann's *Naturgeschichte der Vögel Mitteleuropas*, vii. 33.



Belluno, and Novara (N. Italy). In estimating the numbers of invaders, Professor Newton gave those actually obtained as about 345, and thought that another 155 might be unrecorded and thus lost sight of. Adding the total of 465 to the 150 or 200 observed at Rügen in October, probably on the return journey, and allowing another 50 for birds scattered over Europe, this would bring the number up to at least 665 or 715, probably a very moderate estimate. Breeding is known to have taken place in Denmark and Holland. In 1871 one was obtained in Italy, and in 1872, when they again appeared in England, Gätke records them from Heligoland. Radde records a flock near Lenkoran in the winter of 1875.

In 1876, when it established itself for the first time as a breeding species in the steppes of the Lower Volga and Don, not only did it occur in the British Isles, but also on Heligoland and in Italy. Two were obtained near Lenkoran in 1878. In 1879 it was recorded from Syria; a flock appeared in Bohemia in 1880, and two were obtained in Brunswick in 1882, while two more were recorded from Prussian Silesia in 1883. No definite records were received between 1883 and 1887, when flocks were reported in late summer from Pomerania, Galizia, and Upper Austria. These were evidently the forerunners of the second great invasion of 1888-89. This was on a much larger scale than that of 1863, the numbers being described by Professor Newton as "quite incalculable." The limits on the northern and western sides differed little from those of the previous great incursion, the Gulf of Finland being crossed to Helsingfors, and the most northerly point reached being Roraas in Norway, while in Ireland they ranged as far west as Belmullet. But on the southern side a great extension of range took place, records being received in Italy from Santa Severa near Rome, and also for the first time from Spain, where specimens were obtained at the Albufera of Valencia. Probably this invasion was more carefully recorded and more widely observed, in consequence of the fact that it was to some extent looked for, and the experience of the former incursion had prepared



us for what was to follow. In the British Isles breeding was reported from the Moray area in Scotland, as well as from Yorkshire, where two clutches of eggs were obtained, and in the following year another chick was obtained from the Culbin Sands in Morayshire. On the Continent eggs were reported from Jylland, Denmark (five nests with 3 eggs each), from Schleswig-Holstein (5 eggs), from Hannover (1 egg), and also from Holland. Comparatively few out of the many thousands which must have visited Europe stayed through the winter in their old haunts, but a few remained in 1889 in suitable districts in Great Britain and on the Continent. The breeding of this species on the Culbin Sands in 1889 has already been referred to, and a list of various occurrences (mostly in the early part of the year, but in some cases up to August) in Germany, Austria, Bohemia, Dalmatia, Hungary, Denmark, and the Baltic provinces of Russia, will be found in Naumann's *Naturgeschichte der Vögel Mitteleuropas*, vii. 33.

In 1890 the only records on the Continent were from Denmark and Moravia, but in 1891 it was observed in Hungary, Bohemia, France, and possibly other localities; in 1892 in Moravia; in 1895 in North Germany; in 1897 again in Moravia; and in 1898 in Lower Austria. The only records for 1899 and 1904 are from the English coasts, but in 1906 it was reported from the Dutch as well as from the British coasts.

In 1908 the third important invasion took place. It was, however, on a much smaller scale than that of 1888, and apparently less than that of 1863. Von Tschusi thinks that the main body of migrants became divided into two streams, the northern one avoiding the Carpathians and making for the North Sea and the British Isles in small flocks, while the southern division did not penetrate farther than South Italy, although large numbers were observed on passage in Roumania. Curiously enough, the Frisian islands and the Dutch coast, which were frequented in considerable numbers during previous invasions, were almost entirely avoided in 1908. Some indications



of a return passage are furnished by a record of a large flock of several hundred birds seen near Saskut in Roumania in November.

On reviewing the above records, it will be seen that the only places where these birds showed any signs of settling down to breed were those where the natural conditions were something like those in their Central Asian home. The Culbin Sands in Morayshire, the island of Texel and Zandvoort in Holland, the Ringkjöbing Fjord in Denmark, and the plains of Schleswig-Holstein may be cited as instances of this. Extensive ranges of sandhills, or low-lying sandy plains and sandbanks, are to be found in all of them.

But although a desert form, there is not a single species of sandgrouse which is able to extract enough moisture from its food to dispense with drinking. Generally twice a day, at morning and evening, the flocks make their way to some drinking-place. Prjewalsky describes how about sunrise the great flocks of *Syrrhaptes* leave their roosting-place in the desert to feed, flying very low, and with great swiftness. The male birds often utter a peculiar note in flight, something like the words "*truck, turuck, truck, turuck*,"<sup>1</sup> but this note is only heard from small parties, and the big flocks fly in silence, except for the noise made by their wings, which make a whistling like the wind. After feeding they resort to some pool or salt lake—but fresh water is usually preferred.<sup>2</sup> Before settling down to drink or feed they describe a circle in the air, so as to be assured that the coast is clear. Radde says that the later arrivals call and are answered by those already there. They then join them, standing by the water's-edge in rows of ten or twelve birds, but do not stay long, and are soon on the wing again. With regard to the mode of drinking, Gadow distinctly says that all the sandgrouse differ widely from the pigeons in their method. The latter dip their bills into the

<sup>1</sup> J. Whitaker compares the sound to the word "*teck, teck, teck*" repeated about every second (*Notes on the Birds of Notts*, p. 220); he mentions also a very musical cry, "*te tit to whoi*" (p. 223).

<sup>2</sup> Mr. Bateson noticed them drinking the salt water of Telekul, which has a specific gravity of 1.005, and is almost unfit for cooking.



water as far as the cleft of the mouth, and then suck the water in without raising the head till they have finished drinking. *Pterocles* and *Syrrhaptes*, on the other hand, drink as fowls and other birds do, by taking up water mouthful by mouthful and raising the head to let it run down the throat.<sup>1</sup> They have certain favourite drinking-places, and return to them with the utmost regularity, though the hour depends somewhat on the time of year. Prjewalsky noticed them chiefly between 9 and 10 A.M., but in Scotland they were observed to drink and bathe between 7 and 8 A.M. in October. On the ground they have a very peculiar and awkward gait, taking very short steps and waddling from side to side, while the tracks they make in the sand resemble those of small mammals. When flying to their feeding-grounds, the flocks occasionally rise high in the air, and single birds will sometimes swoop downwards and swerve upwards to rejoin the rest as rooks frequently do. Radde states that in spring he found the crops and stomachs of shot birds full of the seeds of *Salsola*, and adds that they regularly graze on the young juicy shoots of the *Salicorniæ*. Prejwalsky states that in Mongolia they subsist chiefly on the seeds of *Agriophyllum gobicum*. All the sandgrouse are fond of basking in the sun, frequently lying on their side and stretching out a wing, and probably Tristram mistook this attitude for that of the incubating bird, when penning his notes in the *Ibis* on the blackbellied-sandgrouse. Most species of these birds are known to drink twice a day, generally towards nightfall, but whether this is the case with *Syrrhaptes* is not definitely recorded. During the hottest part of the day they rest, and are fond of dusting themselves, like the game birds and fowls, scratching a hole in the loose sand, in which they partially bury themselves, ruffling up their plumage to allow the sand to penetrate thoroughly. At such times they will allow a very near approach, but on account of their protective colouring are difficult to distinguish. In their roosting-habits at night they also recall the partridge, collecting into coveys and resorting to one spot, where they may be heard calling after the darkness has fallen.

<sup>1</sup> *Proc. Zool. Society*, 1882, p. 329.



Plate 93

Sandgrouse and young. The cock is the  
nearer bird, on the right

By H. Grönvold















Although it packs together in autumn, and is sociable at all seasons, generally breeding in colonies and feeding in company, there is little doubt that this sandgrouse is monogamous, and probably pairs for life. Radde's description of the return of the flocks to their breeding-grounds has already been quoted. Probably the first eggs are laid by the middle of April, the hen scratching a hole about five inches in diameter in the sandy soil, and sometimes adding a scanty lining of *Salsola* shoots or marram grass, though this is often wanting. In this nest the peculiar elliptical eggs are laid, usually two or three in number, although occasionally a clutch of four is met with. They are apparently laid at intervals of a day, judging from those which have been laid in confinement. When the hen leaves the nest in the morning to drink, the eggs are left uncovered; but it is noteworthy that when the hen has been snared on the nest, the male bird can be caught by setting another snare. None of the sandgrouse are close sitters, but generally rise from the nest while the intruder is still some distance away. In the case of the pintailed- and singed sandgrouse, both of which have reared their young in captivity, it was noticed that while the protectively coloured hen incubated during the day, the more brightly coloured male relieved his mate by night.<sup>1</sup> After an incubation period of 23 or 24 days<sup>2</sup> the chicks are hatched, and differ widely from those of the pigeons. One which was found in Scotland was figured in the *Ibis* for 1890, plate vii., and a second, as well as a nestling 13 days old, was figured by Grönvold to illustrate Herr Winge's paper in the *Vidensk. Meddel. Naturhist. Forening i. Kjöbenhavn*, 1892, pl. iv. figs. 1 and 2. The chicks are also figured in this work (Pl. 93) by Grönvöld. When first hatched they are covered with yellowish white down, tinged with brownish, while a bold and regular pattern of sienna-brown patches is bordered in many cases with blackish brown. Though, from the construction of its feet,

<sup>1</sup> E. G. B. Meade-Waldo, *Avicultural Magazine*, 1897, p. 179; W. H. St. Quintin, *tom. cit.*, 1899, p. 73.

<sup>2</sup> F. E. Blaauw (*Ibis*, 1890, p. 466) states that eggs placed in an incubator came out after 28 days.



less active than the young of the game birds, one hatched under a hen in Denmark thrive well on grass and clover seeds; and the young of other species of sandgrouse hatched in confinement could feed and forage for themselves at once, and refused to be brooded by their parents after the tenth day. Herr Winge's paper, mentioned above, does not make it clear whether water was supplied to the nestling or not. It would be interesting to know whether this was the case, as it is now known that the pintailed-, singed-, and blackbellied-sandgrouse supply their young with water, the male bird visiting some pool of water in the neighbourhood, and after thoroughly soaking his breast plumage, returning to the nest in order that the young may drink, by taking the water in their bills from the wet feathers. This habit was first recorded by Mr. Meade-Waldo in 1895, and now that the method of procedure in the case of the allied species is known, it should not be difficult to ascertain whether the habit is also common to the genus *Syrrhaptēs*.











THE BRITISH BIRD BOOK







THE  
BRITISH·BIRD  
BOOK

AN ACCOUNT OF ALL THE BIRDS, NESTS  
AND EGGS FOUND IN THE BRITISH ISLES

EDITED·BY  
F·B·KIRKMAN·B·A·OXON

ILLUSTRATED BY TWO HUNDRED COLOURED  
DRAWINGS AND NUMEROUS PHOTOGRAPHS

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# CONTENTS

	PAGES
THE WARBLERS, . . . . .	1-94
WHITETHROAT, LESSER-WHITETHROAT, BLACKCAP, GARDEN- WARBLER, DARTFORD-WARBLER, BRITISH GOLDCREST, CONTI- NENTAL GOLDCREST, FIRECREST, CHIFFCHAFF, WILLOW-WARBLER, ARCTIC WILLOW-WARBLER, WOOD-WARBLER, REED-WARBLER, MARSH-WARBLER, SEDGE-WARBLER, AQUATIC-WARBLER, GRASS- HOPPER-WARBLER.	
HEDGE-SPARROW, . . . . .	95-103
BRITISH HEDGE-SPARROW, CONTINENTAL HEDGE-SPARROW.	
THE STARLINGS, . . . . .	104-142
STARLING, ROSE-COLOURED STARLING.	
THE GOLDEN-ORIOLE, . . . . .	143-155
THE WAXWING, . . . . .	156-169
THE TITS, . . . . .	171-212
BRITISH LONGTAILED-TIT, BRITISH GREAT-TIT, CONTINENTAL GREAT-TIT, BRITISH COAL-TIT, IRISH COAL-TIT, MARSH-TIT, BRITISH WILLOW-TIT, BRITISH BLUE-TIT, CONTINENTAL BLUE-TIT, SCOTTISH CRESTED-TIT, LONGTAILED-TIT.	
THE NUTHATCH, . . . . .	213-221
THE BEARDED-TIT, . . . . .	222-236
THE SHRIKES, . . . . .	237-260
REDBACKED-SHRIKE, GREAT GREY-SHRIKE.	



THE FLYCATCHERS, . . . . .	261-276
SPOTTED-FLYCATCHER, PIED-FLYCATCHER.	
SWALLOWS AND MARTINS, . . . . .	277-317
SWALLOW, HOUSE-MARTIN, SAND-MARTIN.	
THE WOODPECKERS, . . . . .	318-341
GREEN-WOODPECKER, BRITISH GREAT SPOTTED-WOODPECKER, NORTHERN GREAT SPOTTED-WOODPECKER, LESSER SPOTTED- WOODPECKER.	
THE WRYNECK, . . . . .	342-349
THE SWIFT, . . . . .	350-361
THE NIGHTJAR, . . . . .	362-378
THE OWLS, . . . . .	379-421
BARN-OWL, TAWNY-OWL, LONGEARED-OWL, SHORTEARED-OWL, LITTLE-OWL, SNOWY-OWL.	
THE ROLLER, . . . . .	422-432
THE HOOPOE, . . . . .	433-445
THE KINGFISHER, . . . . .	446-457
THE CUCKOO, . . . . .	458-498
THE PIGEONS, . . . . .	499-524
WOOD-PIGEON, STOCK-DOVE, ROCK-DOVE, TURTLE-DOVE.	
PALLAS'S SANDGROUSE, . . . . .	525-540



## LIST OF COLOUR PLATES IN VOL. II

	PLATE	PAGE
WHITETHROATS. By G. E. COLLINS, . . . . .	47	<i>Frontispiece</i>
BLACKCAPS, MALE AND FEMALE. By A. W. SEABY, . . . . .	48	34
LESSER-WHITETHROAT FEEDING YOUNG. By G. E. COLLINS, . . . . .	49	40
GARDEN-WARBLER (Left) AND DARTFORD-WARBLER (Right). By G. E. COLLINS, . . . . .	50	44
GOLDCRESTS. By A. W. SEABY, . . . . .	51	50
WILLOW-WARBLER BUILDING ITS NEST. By G. E. COLLINS, . . . . .	52	64
WOOD-WARBLER FEEDING ITS YOUNG. By A. W. SEABY, . . . . .	53	68
SEDGE-WARBLER. By A. W. SEABY, . . . . .	54	72
REED-WARBLER AT ITS NEST. By G. E. COLLINS, . . . . .	55	78
MARSH-WARBLER (Left) AND GRASSHOPPER-WARBLER (Right). By WINIFRED AUSTEN, . . . . .	56	86
HEDGE-SPARROW. By G. E. COLLINS, . . . . .	57	100
STARLINGS. By A. W. SEABY, . . . . .	58	114
ROSE-COLOURED STARLINGS FIGHTING. By H. GOODCHILD, . . . . .	59	140
GOLDEN-ORIOLE. By WINIFRED AUSTEN, . . . . .	60	152
WAXWINGS. By WINIFRED AUSTEN, . . . . .	61	162
LONGTAILED-TITS BUILDING THEIR NEST. By A. W. SEABY, . . . . .	62	186
(Left) TWO MARSH-TITS ON A SUNFLOWER, ONE DISPUTING POSSESSION WITH A COAL-TIT, . . . . .	63	192
(Right) WILLOW-TITS (see p. 206). By A. W. SEABY, . . . . .	64	200
BLUE-TIT ABOUT TO FEED ITS NESTLINGS. By A. W. SEABY, . . . . .	64	200



	PLATE	PAGE
(Left) GREAT-TIT, (Right) CRESTED-TITS. By A. W. SEABY, . . . . .	65	206
NUTHATCH PICKING OUT THE KERNEL OF A NUT. By A. W. SEABY, . . . . .	66	216
BEARDED-TITS AND NESTLINGS. By WINIFRED AUSTEN, . . . . .	67	228
REDBACKED-SHRIKES IN THEIR LARDER. By A. W. SEABY, . . . . .	68	244
GREAT GREY-SHRIKE (MALE) WITH GOLDCRESTED-WREN IM-PALED UPON A THORN. By A. W. SEABY, . . . . .	69	254
SPOTTED-FLYCATCHER ENTICING ITS YOUNG TO FLY. By A. W. SEABY, . . . . .	70	268
PIED-FLYCATCHERS: THE FEMALE IS ABOUT TO FEED THE YOUNG, THE MALE ON THE RIGHT LOOKING ON. By A. W. SEABY, . . . . .	71	274
HOUSE-MARTIN FEEDING ITS YOUNG. By G. E. COLLINS, . . . . .	72	292
SWALLOW ABOUT TO FEED YOUNG. By G. E. COLLINS, . . . . .	73	304
SAND-MARTINS AT THEIR NEST-HOLES. By G. E. COLLINS, . . . . .	74	312
(Left) LESSER SPOTTED-WOODPECKERS AT THEIR NEST-HOLE, . . . . .	75	332
(Right) GREATER SPOTTED-WOODPECKER (MALE) ABOUT TO FEED NESTLINGS. By A. W. SEABY, . . . . .		
GREEN-WOODPECKER, MALE AND FEMALE, THE LATTER PROTRUDING HER TONGUE TO CATCH ANTS. By A. W. SEABY, . . . . .	76	338
WRYNECKS QUARRELLING. By A. W. SEABY, . . . . .	77	346
SWIFTS. By WINIFRED AUSTEN, . . . . .	78	354
NIGHTJAR (MALE) IN FAVOURITE POSITION ON A BRANCH. By A. W. SEABY, . . . . .	79	368
BARN-OWL HUNTING. By A. W. SEABY, . . . . .	80	398
LONGEARED-OWL FEEDING ITS YOUNG. By WINIFRED AUSTEN, . . . . .	81	404
TAWNY-OWL MOBBED BY SMALL BIRDS. By G. E. LODGE, . . . . .	82	410
SNOWY-OWL WITH HARE. By G. E. LODGE, . . . . .	83	414



# LIST OF COLOUR PLATES

ix

	PLATE	PAGE
SHORTEARED-OWL SUNNING ITSELF (Left Figure). By WINIFRED AUSTEN, . . . . .	84	418
LITTLE-OWL AT THE ENTRANCE TO ITS HOLE (Right Figure). By G. E. LODGE, . . . . .		
ROLLERS, ADULT AND YOUNG. By WINIFRED AUSTEN, . . . . .	85	426
HOOPOES AT THEIR NEST-HOLE. By WINIFRED AUSTEN, . . . . .	86	440
KINGFISHER FEEDING ITS YOUNG. By A. W. SEABY, . . . . .	87	456
CUCKOO UTTERING ITS NOTE. By A. W. SEABY, . . . . .	88	464
EGGS OF CUCKOO ( <i>Cuculus canorus</i> ). By H. GRÖNVOLD, . . . . .	Egg Plate E	404
RING-DOVE COURTING. By A. W. SEABY, . . . . .	89	512
ROCK-DOVE ALIGHTING ON ITS NEST. By WINIFRED AUSTEN, . . . . .	90	516
STOCK-DOVE DRINKING. By G. E. COLLINS, . . . . .	91	520
TURTLE-DOVES. By A. W. SEABY, . . . . .	92	524
SANDGROUSE AND YOUNG. By H. GRÖNVOLD, . . . . .	93	538



## LIST OF BLACK AND WHITE PLATES IN VOL. II

	PLATE	PAGE
WHITETHROAT AND ITS NESTLINGS, . . . . .	XVIII.	2
WHITETHROAT'S NEST, . . . . .		
LESSER-WHITETHROAT'S NEST, . . . . .		
DARTFORD-WARBLE'S NEST, . . . . .		
BLACKCAP'S NEST, . . . . .	XIX.	6
HEN BLACKCAP ON HER NEST, . . . . .		
GARDEN-WARBLE'S NEST, . . . . .		
GARDEN-WARBLE'S NEST WITH YOUNG, . . . . .		
GOLDENCRESTED-WREN'S NEST, . . . . .	XX.	12
CHIFFCHAFF'S NEST, . . . . .		
WILLOW-WREN AT THE ENTRANCE TO ITS NEST IN REEDS, . . . . .		
WILLOW-WREN'S NEST IN GRASS, . . . . .		
WOOD-WREN'S NEST IN A BANK, . . . . .	XXI.	18
WOOD-WREN'S NEST IN WEEDS, . . . . .		
REED-WARBLE FEEDING ITS YOUNG, . . . . .		
MARSH-WARBLE'S NEST, . . . . .		
SEDGE-WARBLE ENTERING ITS NEST, . . . . .	XXII.	26
GRASSHOPPER-WARBLE AND NESTLINGS, . . . . .		
NESTING COLONY OF STARLINGS UNDER STONES ON THE BEACH AT LAMBHOLM, ORKNEY, . . . . .	XXIII.	106
STARLING'S NEST IN THE HOLE OF A WALL. Front stone removed,		
YOUNG STARLING AT THE ENTRANCE TO ITS NEST-HOLE IN A TREE, . . . . .		



# LIST OF BLACK AND WHITE PLATES

xi

	PLATE	PAGE
LONGTAILED-TIT AT ITS NEST, . . . . .	XXIV.	174
LONGTAILED-TIT'S NEST IN THE FORK OF A TREE, . . . . .		
GREAT-TIT'S NEST IN A HOLE IN A WALL. Stone removed to show Nest, . . . . .		
GREAT-TIT'S OPEN NEST BUILT ON AN OLD SONG-THRUSH'S NEST IN A TANGLE OF HONEYSUCKLE, . . . . .		
GREAT-TIT'S NEST IN A LETTER-BOX, . . . . .	XXV.	178
MARSH-TIT'S NEST IN A SUNK FENCE. Stone removed to show Nest, . . . . .		
COAL-TIT'S NEST-HOLE IN A TREE, . . . . .		
SAME COAL-TIT'S NEST WITH FRONT CUT AWAY, . . . . .		
NUTHATCH AT ITS NEST-HOLE IN A TREE, . . . . .	XXVI.	214
NUTHATCH'S NEST IN A BOX, . . . . .		
BEARDED-TIT'S NEST AND EGGS, . . . . .	XXVII.	222
MALE-BEARDED TIT, SHOWING "STRIDE" OF LEGS FROM REED TO REED, AND YOUNG IN NEST, . . . . .		
MALE REDBACKED-SHRIKE AT NEST, . . . . .	XXVIII.	238
FEMALE REDBACKED-SHRIKE AT NEST, . . . . .		
SPOTTED-FLYCATCHER'S NEST UNDER THE THATCH OF A STACK, . . . . .	XXIX.	262
SPOTTED-FLYCATCHER'S NEST IN AN OLD CAP, . . . . .		
SPOTTED-FLYCATCHER'S NEST IN THE FORK OF A TREE, . . . . .		
SWALLOW'S NEST INSIDE A RUINED COTTAGE AGAINST A WALL WITH PRACTICALLY NO SUPPORT, . . . . .	XXX.	280
SWALLOW'S NEST BUILT ON A STUMP INSIDE AN OUTHOUSE, . . . . .		
SANDMARTIN'S NEST. Burrow cut open to show Nest, . . . . .		
FIFTY-TWO HOUSE-MARTINS' NESTS UNDER ONE EAVE, . . . . .	XXXI.	284
HOUSE-MARTINS' NESTS ON THE FACE OF KILNSEY CRAG, WHARFEDALE, . . . . .		
GREEN-WOODPECKER AT THE ENTRANCE TO ITS HOLE, . . . . .		
GREEN-WOODPECKER LOOKING OUT OF ITS HOLE, . . . . .	XXXII.	320
NIGHTJAR'S NEST AND EGGS, . . . . .	XXXIII.	364
NIGHTJAR AND YOUNG, . . . . .		



	PLATE	PAGE
YOUNG BARN-OWL AT THE ENTRANCE TO ITS NEST-HOLE,	XXXIV.	380
SHORTEARED-OWL'S NEST AND EGGS, . . . . .		
YOUNG SHORTEARED-OWLS IN NEST, . . . . .		
TAWNY-OWL NEST AND EGGS AMONG THE ROOTS OF A TREE ON A BANK, . . . . .		
KINGFISHER'S NEST-HOLE OPENED TO SHOW EGGS, . . . . .	XXXV.	448
KINGFISHER'S BREEDING-HAUNT, . . . . .		
THREE CUCKOO'S EGGS IN A HEDGE-SPARROW'S NEST, . . . . .	XXXVI.	460
YOUNG CUCKOO IN WREN'S NEST, . . . . .		
YOUNG CUCKOO IN A REED-WARBLER'S NEST, . . . . .		
YOUNG CUCKOO IN A NEST, WITH EGG IN POSITION FOR EJECT- TION, . . . . .	XXXVII.	474
YOUNG CUCKOO EJECTING CHICK, . . . . .		
RING-DOVE'S NEST, . . . . .	XXXVIII.	502
STOCK-DOVE'S NEST IN A SANDHILL, . . . . .		
STOCK-DOVE'S NEST-HOLE IN A CLIFF, . . . . .		
TURTLE-DOVE'S NEST, . . . . .		







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